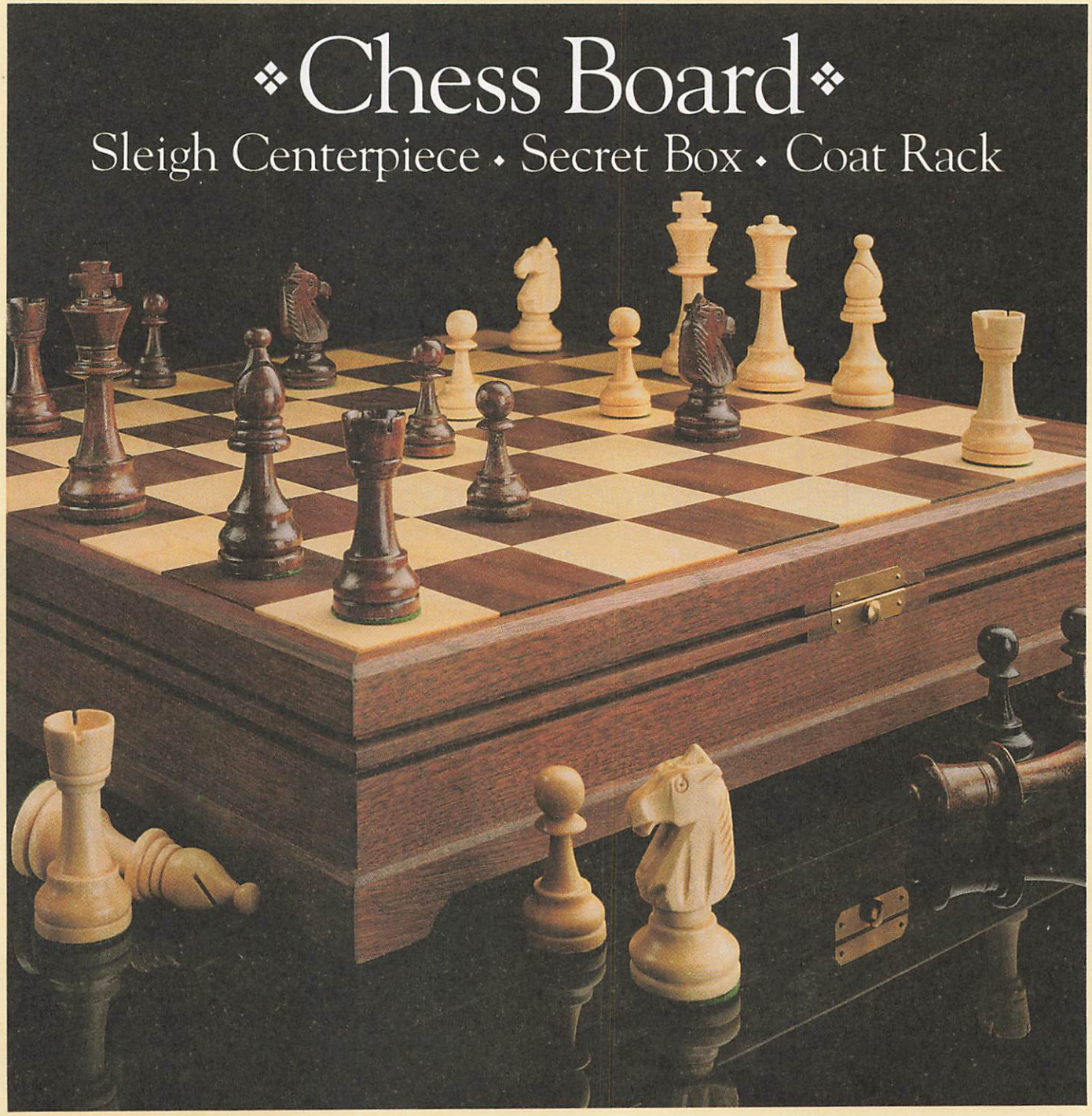
NO. 83 NOTES FROM THE SHOP $3.95

Woodsmith®



No. 83 October, 1992

Woodsmith®

Editor	**Donald B. Peschke**
Managing Editor	**Douglas L. Hicks**
Assistant Editors	**James M. Dolan** **Gordon Gaippe** **Philip A. Totten**
Creative Director	**Ted Kralicek**
Art Director	**Rod Stoakes**
Senior Illustrators	**David Kreyling** **Chris Glowacki**
Illustrators	**Dirk Ver Steeg** **Cinda Shambaugh**
Contributing Illustr.	**Robert H. Whitmer**
Photographer	**Crayola England**
Design Director	**Ken Munkel**
Designers	**Jan Hale Svec** **Kent Welsh**
Shop Manager	**Steve Curtis**
Circulation Director	**Liz Bredeson**
Subscription Manager	**Sandy Baum**
Circulation Analyst	**Jim Woodson**
Newsstand Sales	**Kent A. Buckton**

CORPORATE SERVICES

Controller	**Paul E. Gray**
Accounting	**Linda O'Rourke**
Bookkeeping	**Julianne Spears**
Network Administrator	**Douglas M. Lidster**
Administrative Assts.	**Cheryl A. Scott** **Julia Fish**
Receptionist	**Jeanne Johnson**
Building Maintenance	**Ken Griffith** **Archie Krause**

WOODSMITH SOURCEBOOK

Marketing Director	**Robert Murry**
Art Director	**Cindy Jackson**
Customer Service Mgr.	**Laura McNelly**
Project Supplies	**Leslie Ann Gearhart** **Linda Jones**
Technical Support	**Jonathan Garbison**
Systems Operator	**Linda Morrow**
Receptionist	**Keri Lee**

CUSTOMER SERVICE

Jennie Enos (Supr.), Jeff Janes, Joy Johnson, Sara Johnson, Ami Blanshan, Anna Cox

SHIPPING DEPARTMENT

Jerry Carson (Supervisor), Gloria Sheehan, Ronald Long, Donnie McVey, Chuck Carlson

WOODSMITH STORE

Dave Larson (Manager)
Wendell Stone, Vicki Edwards, Dominic Bazzocco, Steve Johnson

Woodsmith® (ISSN 0164-4114) is published bimonthly (Feb., April, June, Aug., Oct., Dec.) by Woodsmith Corporation, 2200 Grand Ave., Des Moines, IA 50312. Printed in U.S.A.
Woodsmith® is a registered trademark of Woodsmith Corp. Copyright© **1992** Woodsmith Corporation. All rights reserved.
Subscriptions: Single copy: $3.95. One year subscription (6 issues), $17.95. Two years (12 issues), $31.95. (Canada/Foreign $21.95 per year, U.S. funds.)
Second Class Postage Paid at Des Moines, IA and at additional offices.
Postmaster: Send change of address to *Woodsmith*, Box 10718, Des Moines, IA 50350.
Subscription Questions? Call 1-800-333-5075, 8:00 am to 5:00 pm, Central Time, weekdays.

EDITOR'S COLUMN

Sawdust

One of the things I like about building small projects is that I can practice different techniques — without making a big investment in time or money.

The Sleigh Centerpiece on page 18 is a good example. It's not that big, but it involved something I haven't had a lot of experience with — metalworking. The idea of adding decorative brass rods to the Sleigh came up when our staff was looking at some old Currier and Ives prints for design ideas.

No problem. I could simply cut the brass rods with a hacksaw and glue them into the holes with epoxy.

But then we started talking about making the Sleigh look a little more realistic by adding "springs" made of brass. So now I had to deal with bending brass strips. A little more challenging.

As it turned out, it wasn't all that difficult. Brass is so soft it cuts and bends easily. (It can even be cut with woodworking tools.) And we found a perfect bending jig — a three-pound coffee can.

LAMINATION. Though adding the brass was a nice addition to the Sleigh and I learned some things from it, I think the part that was the most interesting to work on was the runners.

A couple of years ago, we printed an issue that featured bent lamination. In that issue we explained how you could bend and glue together thin strips of wood into a variety of shapes (and projects).

But the bent lamination process we used involved building some pretty elaborate forms, soaking a lot of strips in the bathtub, and then borrowing every C-clamp in the neighborhood. The end result was some interesting projects, but it was easy to get bogged down in the preparation.

The runners on the Sleigh are different. They only require five thin strips of walnut and a 4"-long piece of PVC pipe. PVC pipe? It's used as a form to bend the curved end of the runner to shape.

Actually, there's a little more to the story. I originally clamped the strip to the PVC pipe with a bunch of small C-clamps. But when Cinda, one of our technical illustrators, began drawing all these clamps, she decided there must be a better way. (At least she claimed there must be a better way. C-clamps are one of the most time-consuming things to draw.)

Anyway, Cinda came up with an idea to eliminate some of the clamps. Wrap a larger piece of pipe around the *outside* of the wood strips. We tested it out and it worked a lot easier, and also helped protect the strips from being dented by the clamp pads. (But we didn't let Cinda off that easy. There are still some C-clamps needed.)

SMALL PROJECTS. I'm starting to get off the subject from my original thought. Small projects. I guess what I'm saying is that the Sleigh gave me a good opportunity to try out some things on a small scale.

And there are a number of other small projects in this issue that give similar opportunities to experiment with different techniques and designs. Like how to make a Chess Board so all of the contrasting squares come out positioned exactly right (page 6). Or how to build a secret drawer into a box (page 24).

HOLIDAY ISSUE. It's not just a coincidence that we're featuring all of these small projects at the same time in this issue. For a number of years we've published an issue of *Woodsmith* every fall that featured gift projects. Last year we didn't. And we heard about it.

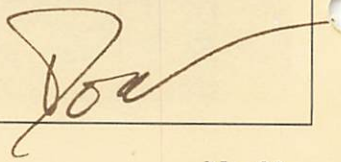
So I decided to bring back the gift issue. This issue should be early enough to give you time to get into the shop and complete a project or two before the last-minute holiday rush.

A SMALL STORY. Finally, I can't leave this subject of small projects without sharing a short story.

Recently, a couple stopped by our offices for a tour. The woman proudly told me how her husband builds "every" project that appears in *Woodsmith*. And they have most of these projects on display in their home. I began to wonder how they could fit all of those projects in their house.

Then she told me what they do. When *Woodsmith* arrives every two months, they go through this negotiating process. Which of the projects can he build full-size? And which as scale models?

Scale models? Yes. To keep material costs down, he has built many of the *Woodsmith* projects in exact 1:4 scale. That way he gets all the woodworking experience he wants (including making all the joints), but all of the projects still fit in their house. Sounds like a fair compromise to me.



Contents

Tips & Techniques 4 *Six great tips. 1) Trimming Laminate. 2) Making a Marking Gauge. 3) Cutting Plywood. 4) Checking a Miter Gauge. Plus Quick Tips.*

Chess Board 6 *This solid wood Chess Board looks like it's built from little squares of wood. It's not — there's an easier way.*

Child's Clothes Rack 12 *The train is assembled like a jigsaw puzzle. Long axles and big wheels serve as clothes hooks. Who knows, this may be one clothes rack the kids will like well enough to use.*

Shop Notes 16 *Four tips from our shop. 1) Cutting a Lid Off a Box. 2) Sanding Mitered Corners. 3) Keyhole Hangers. 4) Routing a Smooth Edge.*

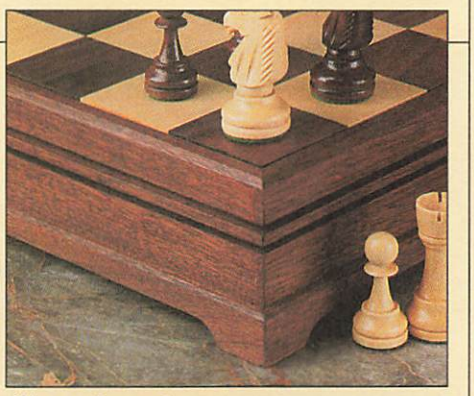
Sleigh Centerpiece 18 *Laminated runners and detailed joinery make this Sleigh Centerpiece an heirloom. The polished brass springs add a note of authenticity.*

Secret Box 24 *Here's an interesting small box with a secret — a hidden drawer. The illusion is in the joinery: tight miters and a sliding panel.*

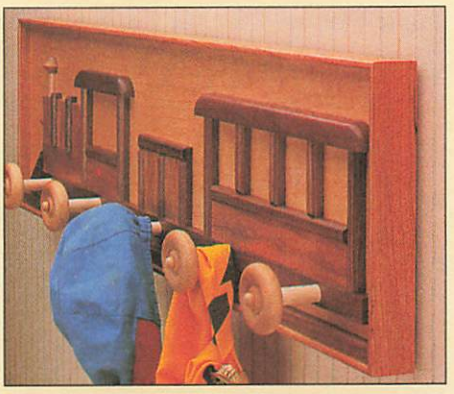
Talking Shop 28 *Answers to questions from readers. 1) Redwood Trees. 2) Hard and Rock Maple. 3) Carbide Cutters. 4) Multi-Purpose Tools vs. Stand-Alone Tools. 5) Glue Strength.*

Finishing Tips Contest 30 *The results are in for our Shop Tips Contest. The Winners: Using One-Step Finishes, Finishing Large Surfaces, and a Finish Scraper.*

Sources 31 *Hardware and supplies needed for the projects in this issue.*



Chess Board *page 6*



Child's Clothes Rack *page 12*

Sleigh Centerpiece *page 18*

Secret Box *page 24*

Tips & Techniques

TRIMMING LAMINATE

I made a new router table top with a Formica work surface. Typically, after gluing the Formica to the base material, you'd trim it to size with a flush trim bit in a router. But here's a technique I've used for the last twenty years to trim straight pieces on the table saw.

To do this, you need to make an auxiliary "fence." This isn't a typical auxiliary fence mounted vertically to the rip fence. Instead, this fence lies flat on the saw table, see Fig. 1. The blade is buried in the edge of the fence, so the outside edge of the blade is flush with the fence.

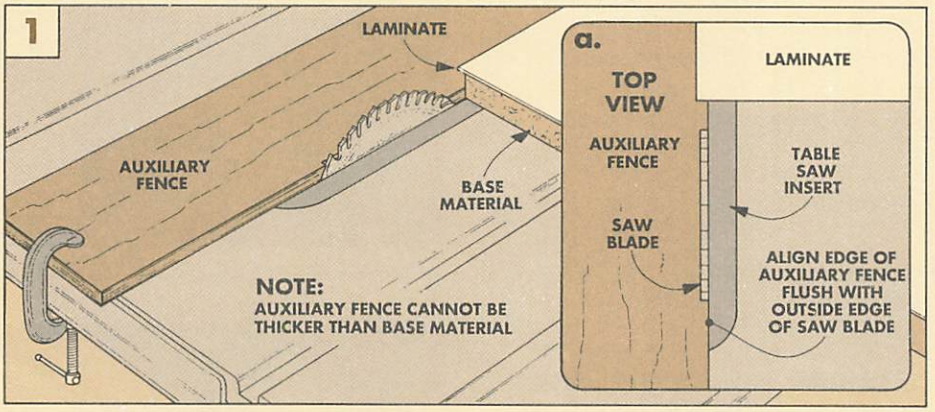
This way the base material can slide along the fence untouched by the blade. Only the Formica that extends past the edge of the base material, and overlaps the fence, gets cut off.

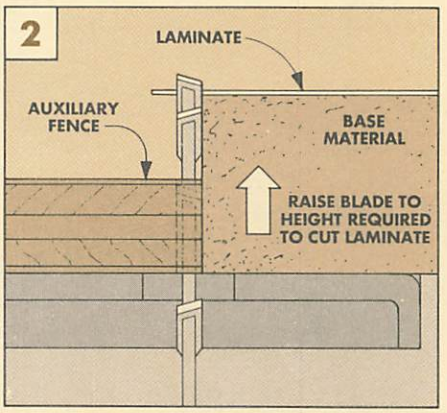
I made my fence from a piece of plywood. It can be the same thickness or thinner than the base material, but *not* thicker.

To make the fence, first lower the blade into the saw table. Then, clamp the plywood to the table so the edge of the plywood is flush with the outside edge of the saw blade, see Fig. 1a.

Now turn on the saw and raise the blade through the plywood until the blade is high enough to cut the laminate, see Fig. 2.

Wayne Fix
Lihue Kauai, Hawaii



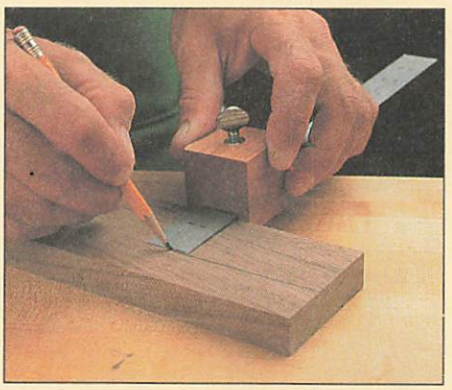


MARKING GAUGE

I recently purchased a good quality steel rule. Then I got the idea to use it as a marking gauge, see photo at right.

To do this, I made an adjustable stop out of a block of wood and a thumb screw.

Begin with an oversize blank 1½" wide by 1¾" high, and about 6" long. Rip a ⅜"-thick strip off the bottom of the blank.



Next, to create a slot to accept the rule, cut a groove in the bottom side of the blank that matches the width and thickness of your steel rule (1" wide by 3/64" deep in my case), see Fig. 1.

With the groove cut, you can cut the blank and bottom piece to finished length (1½").

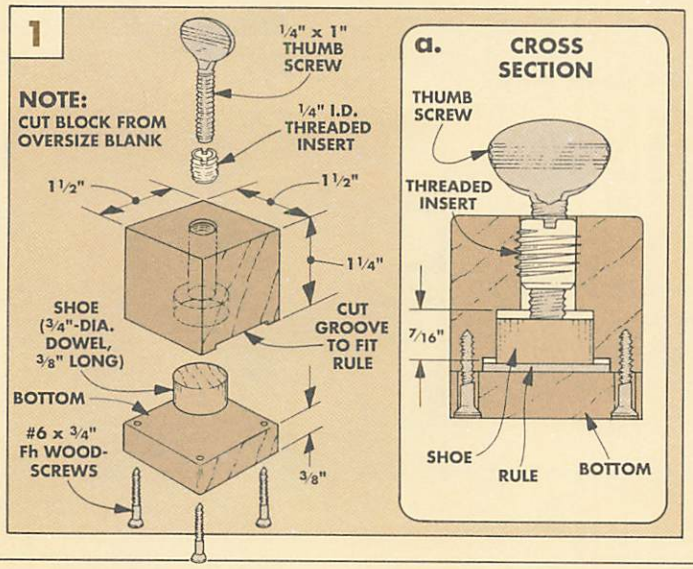
Now drill a hole, centered in the groove, for a piece of ¾"-dia. dowel that serves as a shoe, see Fig. 1a. The shoe prevents the thumb screw from denting or scratching the rule.

Next, bore a hole centered in the shoe hole for the threaded insert. Then screw in the threaded insert.

Finally, insert the shoe and screw on the bottom piece.

To use the marking gauge, slip the rule into the slot. Then slide the stop block along the rule to the desired position and tighten the thumb screw.

Beldon Peters
Canyon Lake, Texas



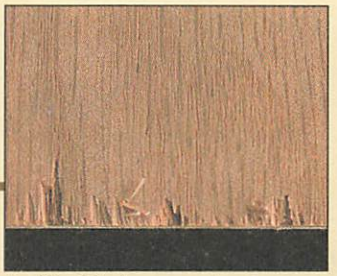
CUTTING PLYWOOD

■ When cutting plywood with a circular saw, I always face the good surface of the plywood down since the blade causes chipout on the top ("up") side. But sometimes I want a clean cut on *both* sides of the plywood.

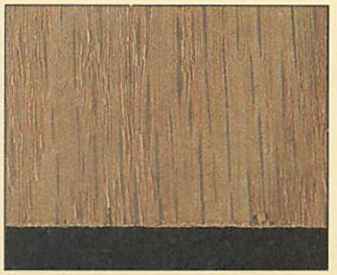
To prevent chipout on the top side, I attach an auxiliary plate to the saw's base plate, see Fig. 1. The auxiliary plate has a "zero clearance" blade slot cut in it. This backs up the wood fibers along the cut line and prevents chipout, see photos at right.

The idea is pretty simple. Screw a piece of ¼" Masonite to the saw's base plate, see Fig. 1. Then plunge the blade through it. Now you've got a plate with a zero clearance blade slot.

The only problem is that now the blade guard won't work. It's held back by the auxiliary plate, so the blade is left exposed — and that's not safe.



▲ *The blade on a circular saw chips out the wood fibers on the top side of the plywood.*

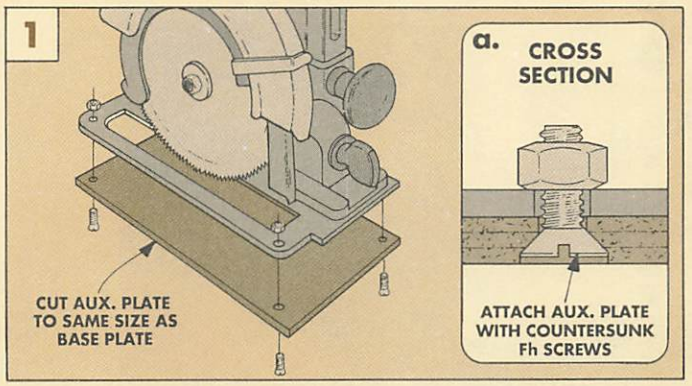


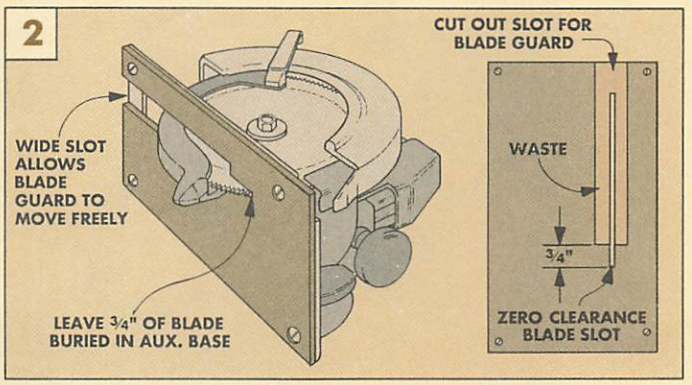
▲ *Attaching an auxiliary base plate with a "zero clearance" blade slot prevents chipout.*

To solve this problem, I cut a wide second slot centered on the first, see Fig. 2. Cut it wide enough to allow the guard to move freely, but stop it ¾" back from the forward end of the blade slot, see Detail in Fig. 2.

The shortened blade slot still prevents chipout because chipout occurs at the leading edge of the blade. And that's still "buried" in the narrow slot.

Gordon Raver
Fallbrook, California




2
CUT OUT SLOT FOR BLADE GUARD
WIDE SLOT ALLOWS BLADE GUARD TO MOVE FREELY
WASTE
¾"
LEAVE ¾" OF BLADE BURIED IN AUX. BASE
ZERO CLEARANCE BLADE SLOT

CHECKING A MITER GAUGE

■ When cutting picture frames or other mitered joints, I want to be certain that the miter gauge on my table saw is set to precisely 45°. So I use a framing square to check its accuracy before cutting.

To do this, I lay the framing square on the saw table and align the 5" marks on the inside edges of the square with one side of the miter gauge slot, see Fig. 1.

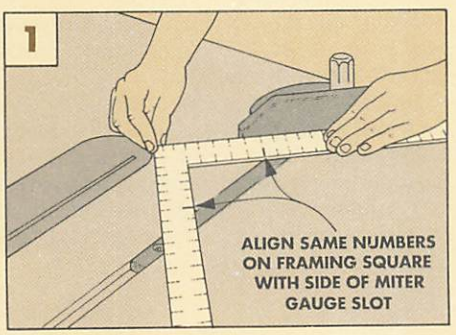
Now loosen the angle lock on the miter gauge. Then slide the face of the miter gauge against the framing square and lock in the angle.

This technique gives you accurate miters if the saw blade is parallel to the miter gauge slot (which it should be).

It's also important that your framing square is *truly* square.

Since most framing squares get dropped and banged around a lot, check your framing square with a try square or another square you're sure of.

Mike Rogerson
Cupertino, California



QUICK TIPS

LABELING TAPE

■ When I need to create a slick surface so one piece can easily slide along another (as on a jig), I use a strip of ¾"-wide plastic labeling tape. The tape, used for making embossed labels, is adhesive-backed, so it's easy to attach to the sliding surfaces of jigs and fences.

Labeling tape is available at office supply stores. It comes in several widths from ¼" to ¾".

William Landau
Skokie, Illinois

SINK CUT-OUTS

■ To save my workbench from glue spills and squeeze-out when I'm gluing up a project, I protect the surface with a sink cut-out. Since they're usually flat, they make a good gluing surface. And best of all, glue doesn't stick to them.

Cut-outs are available at cabinet shops and home centers at a surprisingly low cost — sometimes they're free.

Eugene Daubenspeck
Rushville, Indiana

SEND IN YOUR TIPS

If you would like to share an original tip or idea, just send it to *Woodsmith*, Tips and Techniques, 2200 Grand Ave., Des Moines, IA 50312.

We will pay (upon publication) $15 to $100, depending on the published length of the tip. Please include an explanation, a photo or sketch (we'll draw a new one), and a daytime telephone number, in case we have some questions.

Chess Board

You don't have to cut 64 little squares to build this Chess Board. Just four strips of maple and four strips of walnut. The board is actually the lid for a walnut case that provides a storage place for chess pieces.

The biggest problem in building a chess board is figuring out how to deal with all those little squares. The solution is simple — you don't.

THE BOARD. The squares in this Chess Board aren't a problem because they don't start out as squares at all. They start out as strips of wood that are glued together, then cut apart and glued together again.

I used maple for the light squares, and walnut for the dark squares and the case. (Of course you'll need to supply the chess pieces or checkers — see page 31 for sources of each.)

JOINERY. Although this Chess Board is ready for use after the top is built, I decided to add a mitered case around the board to provide a place to store the game pieces, see photo on page 32.

DESIGN. The lid of the Chess Board is hinged to the case, but it doesn't open from the front as you might expect. Instead, the lid opens from the side. This way, players sitting across from each other can both reach inside to take out their game pieces.

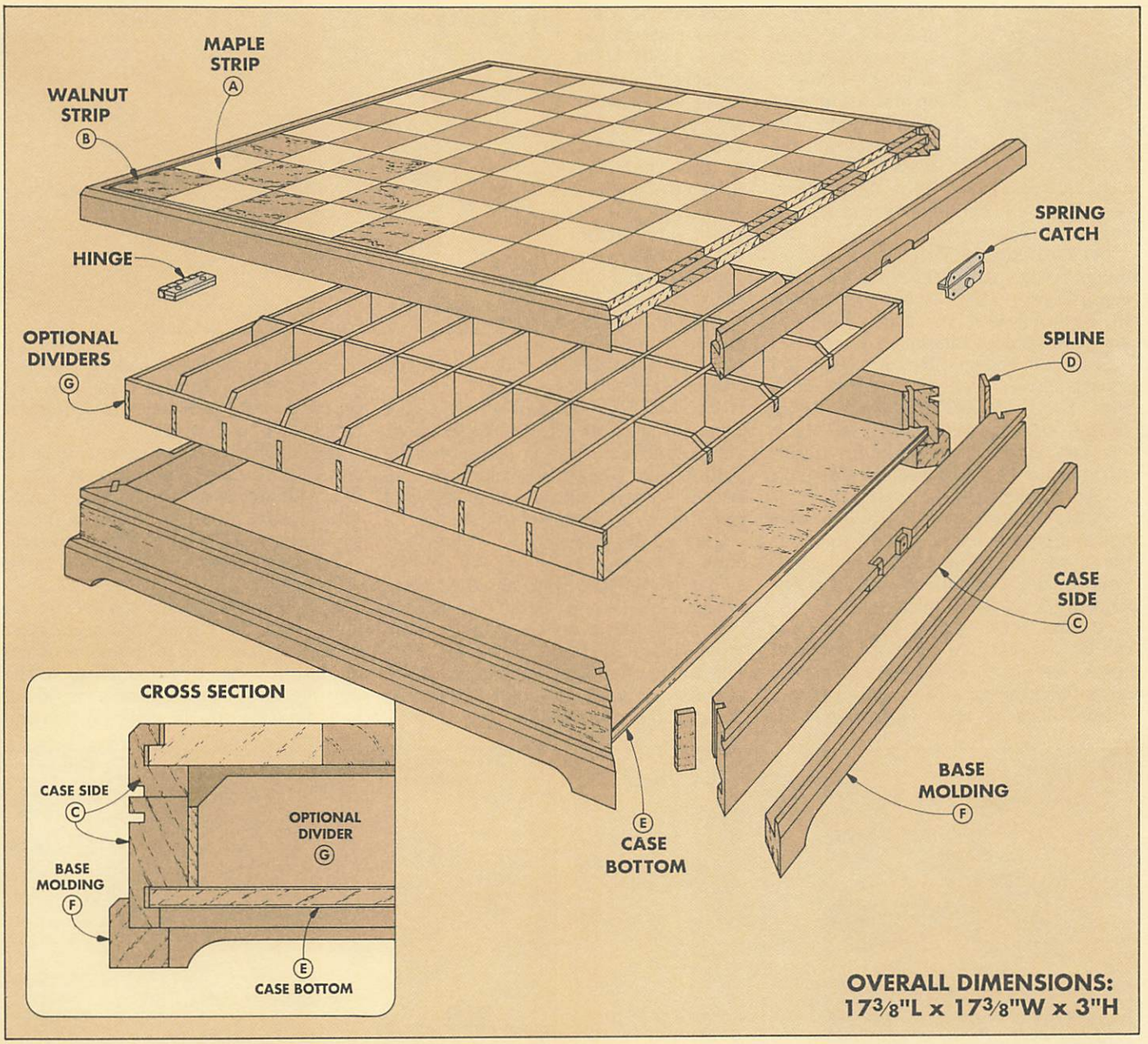
ORIENTATION. There's another reason for paying attention to how the board is oriented. In the game of chess, each player (as they face one another) should have a white square in the lower right corner. This is where the king's rook starts out.

If you build the box with the board installed the other way, it will still work. You'll just have to open it from front to back instead of side to side.

HARDWARE. To add a bit of accent to the case, I cut a pair of shallow grooves around the outside. Then I installed a solid brass spring catch and neat little square-knuckle hinges that fit between the grooves.

The hinges stop the lid when it's opened about 110°. If you use these hinges, no lid support is needed.

EXPLODED VIEW



OVERALL DIMENSIONS:
17 3/8"L x 17 3/8"W x 3"H

MATERIALS

WOOD PARTS

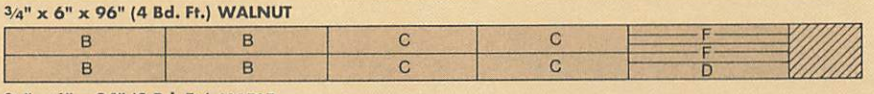
A	Maple Strips (4)	¾ x 3 - 18½ (rgh)
B	Walnut Strips (4)	¾ x 3 - 18½ (rgh)
C	Case Sides (4)	¾ x 2⅝ - 16⅞
D	Splines (4)	⅛ x 1⅝ - ½
E	Case Bottom	¼ ply - 16⅜ x 16⅜
F	Base Molding (4)	¾ x ⅞ - 17
G	Option. Dividers (14)	⅛ x 1⅜ - 15⅜

SUPPLIES

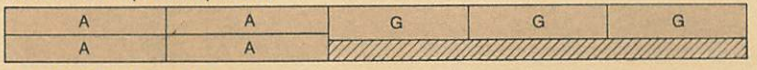
- Jewelry Box Stop Hinges (2)
- Spring Catch (1)
- Suede-Tex or Felt Lining

CUTTING DIAGRAM

¾" x 6" x 96" (4 Bd. Ft.) WALNUT



¾" x 6" x 84" (3 Bd. Ft.) MAPLE

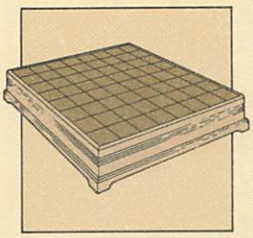


¼" PLYWOOD 18" x 18"

NOTE:
PARTS A & B ARE MADE FROM ¾"-THICK STOCK THAT'S PLANED TO ½" THICK AFTER THE PLAYING SURFACE IS ASSEMBLED

ALSO NOTE THAT OPTIONAL DIVIDERS (G) ARE RESAWN FROM ¾"-THICK STOCK

THE BOARD



The playing surface of the Chess Board starts out like a small table top—it's made up of strips of wood edge-glued together. But the strips are alternating light and dark-colored woods. (This is how you start creating the checkered effect.)

OVERSIZE STRIPS. There are two other things to take into consideration when gluing up the panel. First, start with longer **strips (A, B)** than needed. This length (18½") allows for trimming to finished size later.

Second, to end up with uniform-size (2") squares, the *inside* strips must start out 2" wide. The two *outside* strips — one of each color — start out wider (2½"), see Fig. 1. This way, there's room to trim the outside strips later. And still allow room for a tongue (to fit in the sides of the case), refer to Fig. 5.

FLUSH ENDS & FLAT TOP. When the glue has dried on the edge-glued panel, square up the uneven ends of the board. Then I planed (you could also sand) each side perfectly smooth and flat (to ⅝" thick).

"BARBER POLE" STRIPS. Now the panel can be crosscut into eight "barber pole" strips, see Fig. 2. Again, the two outside strips should be cut wider than the rest.

Note: Keep the best-looking side of the panel face *up* while you're cutting. And place each strip back together in the same order as it came off the panel.

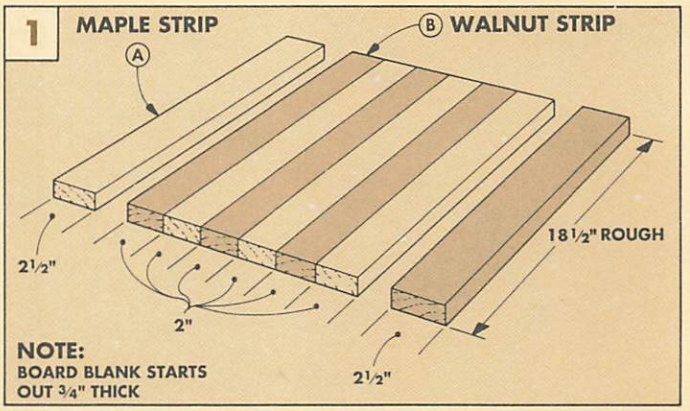
RE-GLUE & PLANE. At this time the strips can be glued back together to form a chess board. But first, turn every other strip end-for-end, see Fig. 3.

The idea is to end up with 2½"-wide squares around all sides of the board. And different colors at each corner.

Shop Note: To help keep the ends — and faces — of each strip flush, I first made an assembly platform, see Fig. 3. Also, wax the platform to keep glue from sticking. Then, to keep the corners of all the squares aligned, I glued the strips together one at a time.

Once all the strips are glued together, clamp across the panel to pull the joints together tight. After the glue has dried, plane or sand the panel to finished thickness (½").

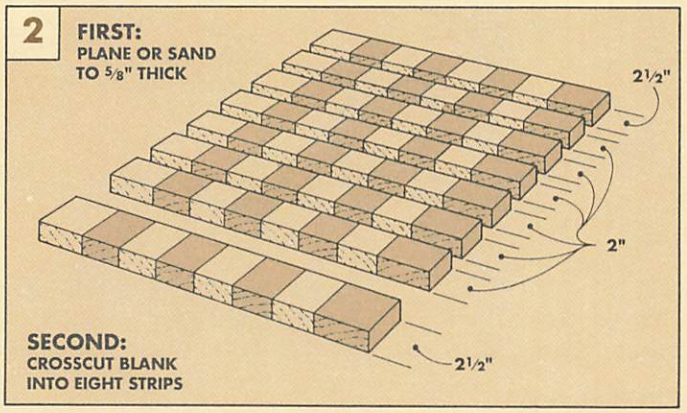
TRIM TO SIZE. Now the panel can be trimmed to finished size. To allow for a 3/16"-wide tongue all around, I cut the panel 16⅜" square. (This equals eight 2" squares across, plus two tongues.)

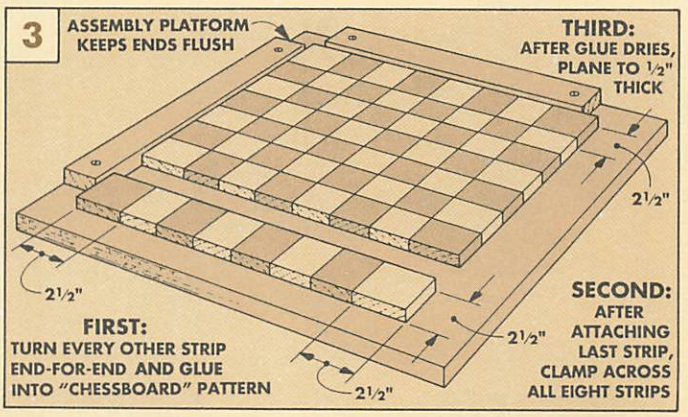


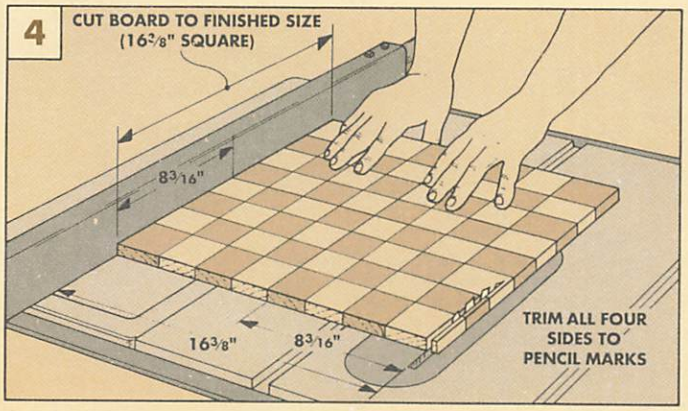
To do this, first make a mark near each corner the same distance (8 3/16") out from the center of the panel, see Fig. 4. Then cut off each edge at the mark.

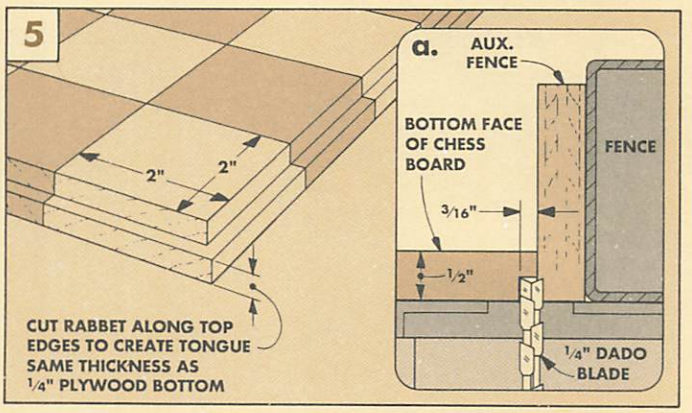
FOUR RABBETS. Next a rabbet can be cut along all four edges of the board, see Fig. 5. These rabbets create tongues that fit into a groove all around the inside of the assembled case. The rabbets also produce outside squares identical in size to the inside squares (2" by 2").

Note: Cut the rabbets along the *top* edge of the board, see Fig. 5a. Also, sneak up on the depth of the rabbet so the tongues match the thickness of a piece of ¼" plywood. This way, the chess board top and plywood bottom fit into the case the same way later on.

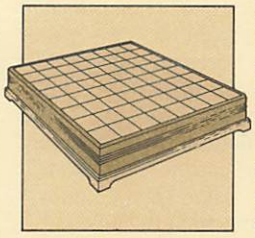








THE CASE



To provide a space for holding game pieces, I built a case that uses the chess board as a lid.

The case is built from four identical-size pieces of stock which are all machined the same way.

CUT TO SIZE. Begin the case by cutting four blanks for the **case sides (C)** to finished width and rough length, see Fig. 6.

INSIDE GROOVES. Then grooves can be cut along the inside face of each piece to hold the chess board top and plywood bottom. I cut each groove in two passes on the table saw, see Fig. 6. Cut the grooves to width to match the thickness of the ¼" plywood to be used for the case bottom (E), see Figs. 6a and 6b.

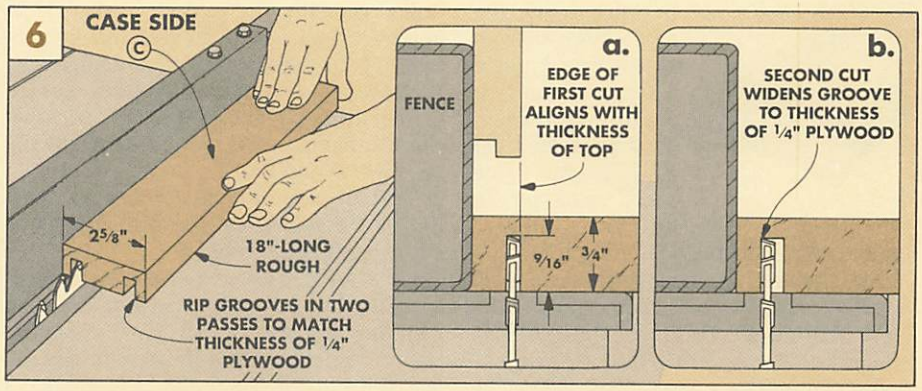
RABBET & CHAMFER. To allow room for the chess board to "float" in the case, next cut a rabbet along the *inside* edge of each piece, see Fig. 7. Then rout a chamfer along the top *outside* edge of each piece, see Fig. 8.

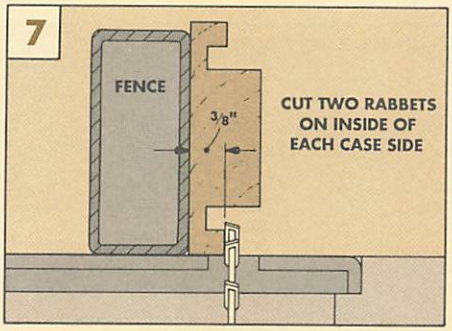
MITERS. The case sides are joined with miters cut across the ends, see Fig. 9. They're all mitered to the exact same length.

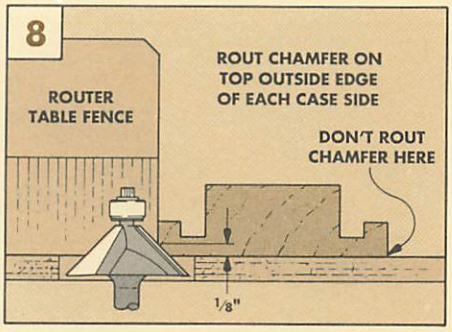
To determine this length, first measure the chess board (mine is 16⅜" square). Then add ⅛" to allow for a 1/16" gap all around, see Fig. 9b. Finally, add ⅜" to account for the thickness of the two sides.

I mitered all four case sides to a length of 16⅞" (long-point to long-point), see Fig. 9.

KERFS & SPLINES. The mitered ends of the sides are held together with splines that fit into kerfs. I cut the kerfs on the table saw with the blade set to 45°, see Fig. 9a.







Then cut four **splines (D)** to length to fit across the kerfs. Note the grain direction of the splines, see Exploded View on page 7.

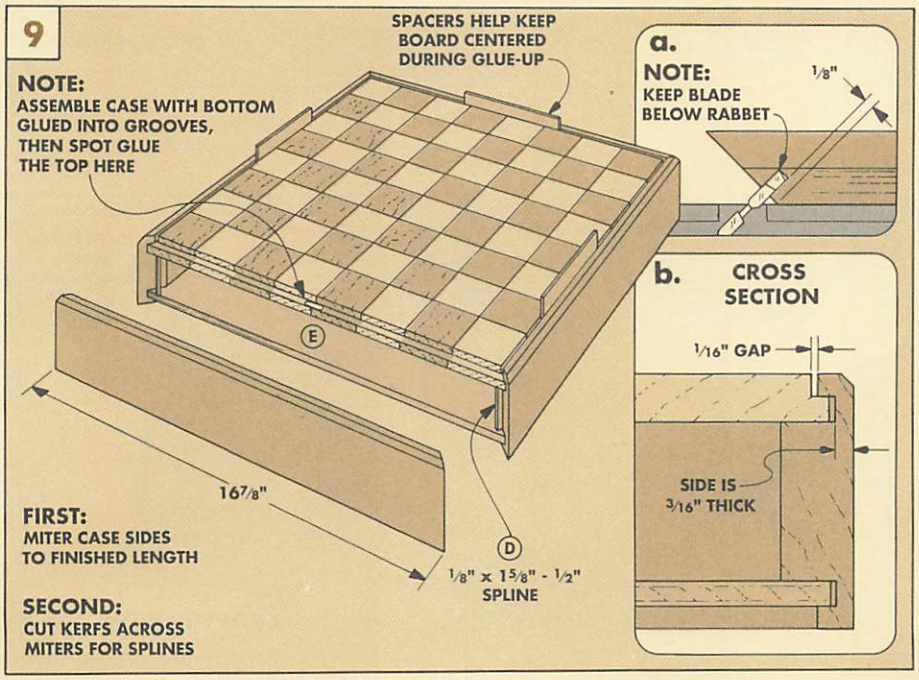
PLYWOOD BOTTOM. Before assembling the case, cut a piece of ¼" plywood for the **case bottom (E)**, see Fig. 9. This should be the same size as the chess board, see Fig. 9b.

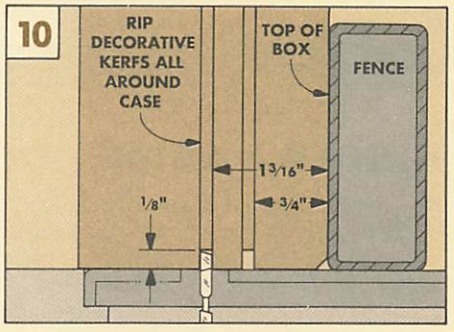
INSTALL BOARD AND BOTTOM. The case can now be glued together with the top and bottom in place. This is an all-at-one-time process, so it helps to use a slow-set (white) glue in all the joints and mating pieces.

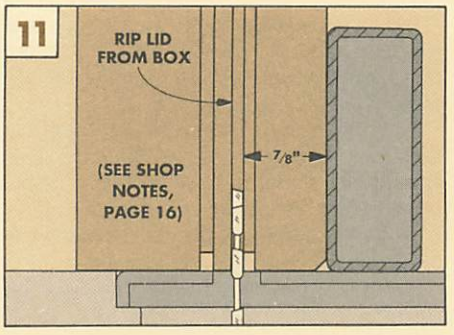
Note: The plywood bottom is glued into the grooves, but so the top can "float," add just a spot of glue before assembly, see Fig. 9.

DECORATIVE KERFS. To give the flat sides of the case a more interesting look, I cut a pair of decorative kerfs around the box, see Fig. 10. (For a flat bottom, I used a rip blade.)

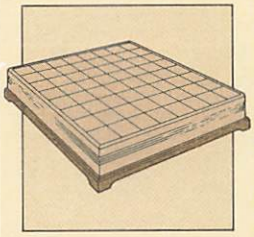
CUT OFF LID. Now the lid can be cut away from the case, see Fig. 11. Refer to Shop Notes on page 16 for more on how I did this.







BASE MOLDING



In order to give the case a more finished appearance, I added a strip of molding around the base. This base molding also lifts the game board up so you can get your fingers under it to pick up the box.

TWO BLANKS. The four strips of molding start out as two oversize blanks, see Fig. 12. Note: The rough length of these blanks should be 5/8" *longer* than the case side.

After cutting the blanks, two holes can be drilled near the end of each blank. These holes are later part of an arch that creates "feet" on the ends of each piece of molding.

CHAMFERS & RABBETS. Once the holes are drilled in each blank, cut a decorative chamfer along the two edges of each blank, see Figs. 13 and 13a.

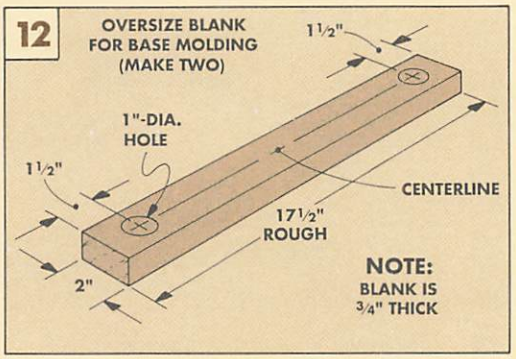
Next, to create a ledge for the case to sit on, rout a rabbet on the remaining two edges, see Figs. 14 and 14a.

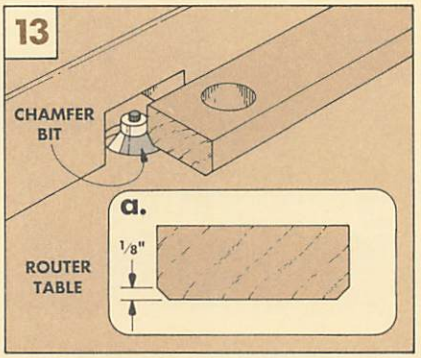
RIP & ROUT. The next step is to rip each molding blank to produce two strips of **base molding (F)**, see Fig. 15. Then, clean out the waste between the holes to create the feet at each end. To do this, I first made a rough cut with the band saw. Then I cleaned up the edge with a straight bit in the router table. (Refer to Shop Notes on page 17.)

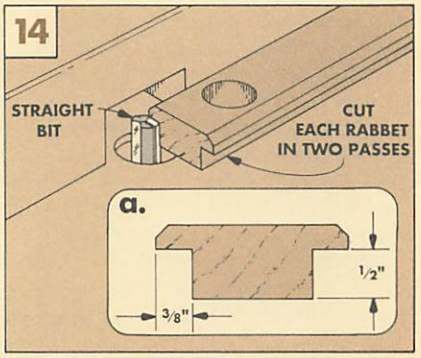
MITER & ATTACH. Now the strips of molding can be mitered to finished length. There are a couple of considerations when cutting these miters. First, to keep the "feet" on each end of the strips the same size, a uniform amount needs to be cut off both ends.

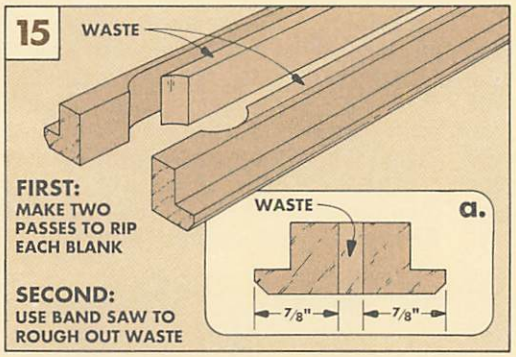
And second, the molding has to be mitered to fit around the case. To do this, sneak up on the final lengths (cutting or sanding from both ends) until they just fit.

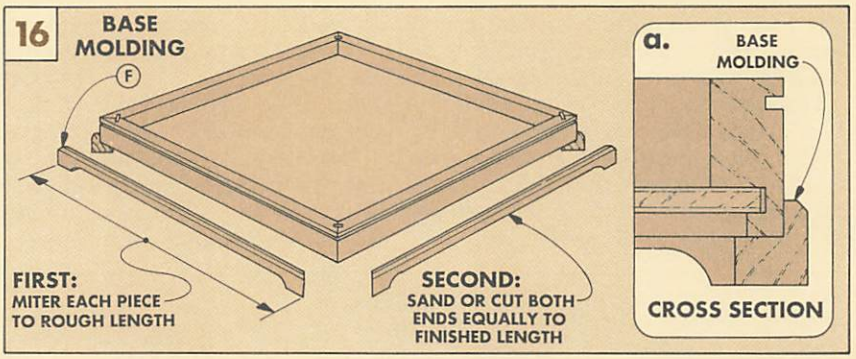
Now the molding can be glued around the base of the case, see Figs. 16 and 16a.











HINGES & LATCH

Now the lid can be attached to the case.

The first thing to do is to determine which will be the "front" of the box. (A front has a white square in the lower right corner.)

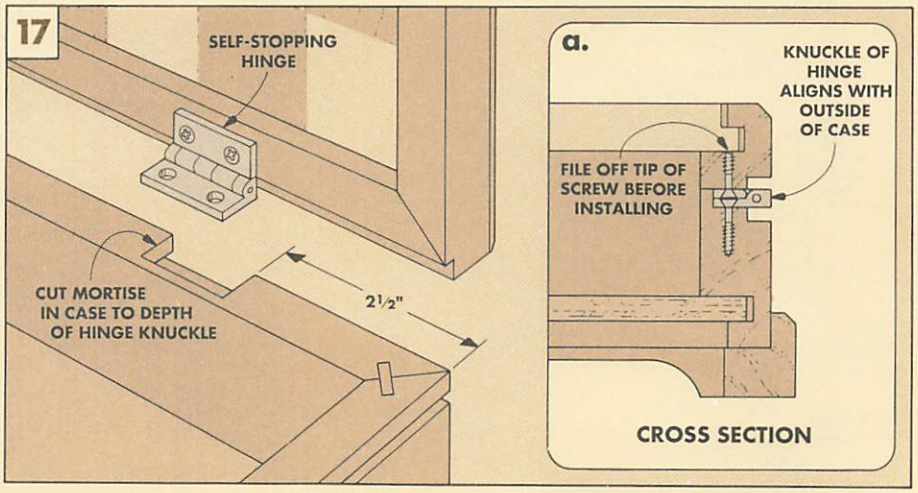
I attached the hinges so the lid opens to the *side*.

HINGE MORTISES. With the hinges that you'll be using in hand, lay out the position of the mortises in two places along the top edge of the case side, see Fig. 17.

Now cut the mortises to the same depth as the thickness of the hinge knuckle. This should also equal the width of the "ridge" between the decorative kerfs, see Fig. 17a.

Note: To make it easier, I mortised the hinge into the case *only*, not the lid.

ATTACH LID. Each hinge can now be screwed to the lid and the case.

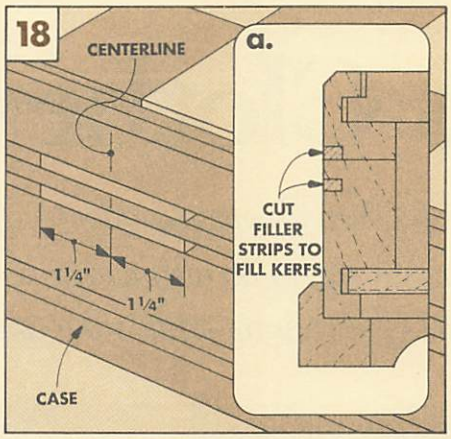


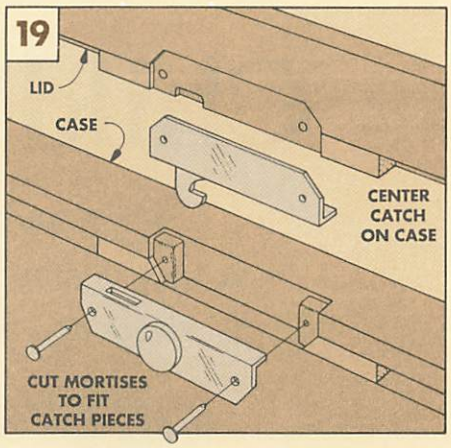
CONTINUED

FILLER STRIPS. A spring catch is installed on the opposite side of the case from the hinges. But because the catch will span the two decorative kerfs, I first filled the kerfs with short filler strips, see Fig. 18.

CATCH MORTISES. Now, depending on the type of catch being used, shallow mortises might have to be cut for both halves of the catch, see Fig. 19. Then both parts of the catch can be attached to the case.

Note: *Woodsmith Project Supplies* is offering two stop hinges and one spring catch with mounting pins. These are identical to those shown on this Chess Board, see page 31. The spring catch comes with detailed instructions for installation.





OPTIONAL DIVIDERS

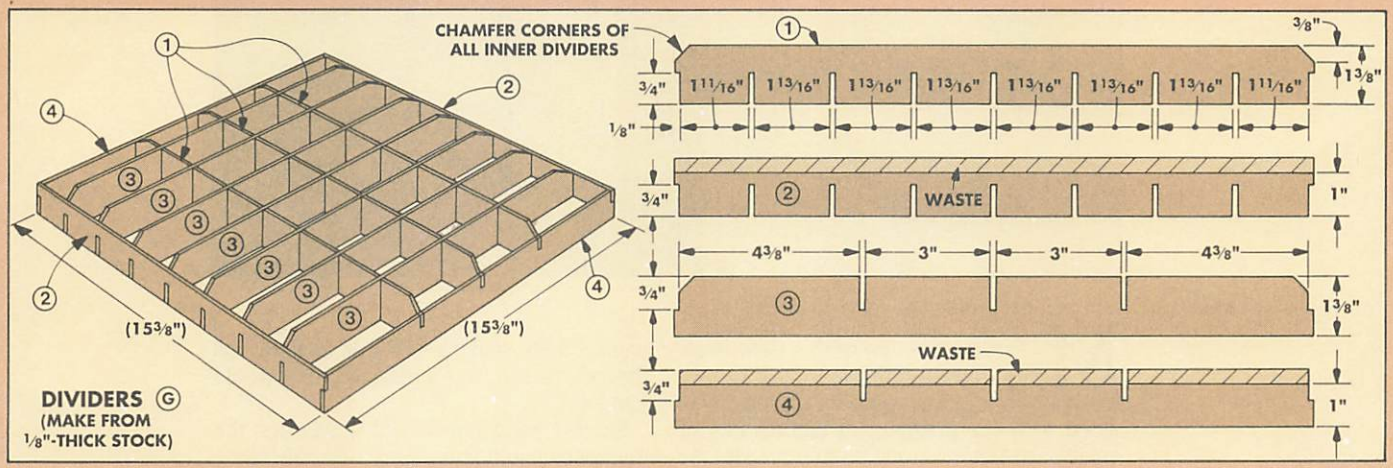
The inside of the Chess Board will hold a full set of chess pieces. But to keep the pieces from rattling around, I went one step further — I built a set of dividers to fit inside.

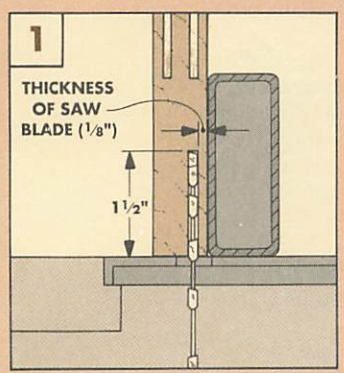
CUT STRIPS. The **optional dividers (G)** are just 14 strips of thin stock that fit together with interlocking notches. I resawed all the strips from pieces of maple to a thickness slightly *less* than the width of the saw blade, see Fig. 1. Then rip them all to 1⅜", see Fig. 2. Now cut the strips to length to match the inside dimensions of the box, see Fig. 3.

CUT NOTCHES. All the strips are notched using the table saw with the blade set to a height a little more than half the width of the strips, see Fig. 4. (I set the blade ¾" high.)

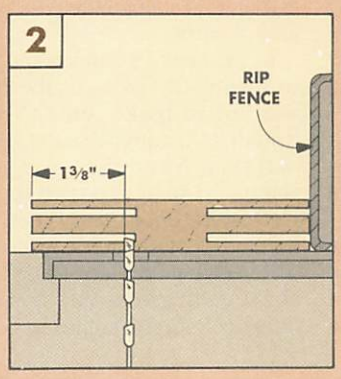
To prevent chipout as the pieces are cut, attach a backing board to the miter gauge.

TWO PILES. I separated the strips into two piles: one for the five front-to-back strips **(1 & 2)**, and one for the nine left-to-right strips **(3 & 4)**. Cut notches on the five strips, set them aside and cut notches on the remaining nine. Then rip strips **2 & 4** to 1" wide.

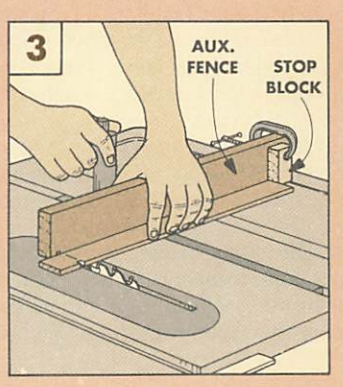




Begin by resawing enough ¾"-thick maple to produce fourteen strips all the same thickness.



Adjust the height of the saw blade to rip the strips one at a time to a width of 1⅜".

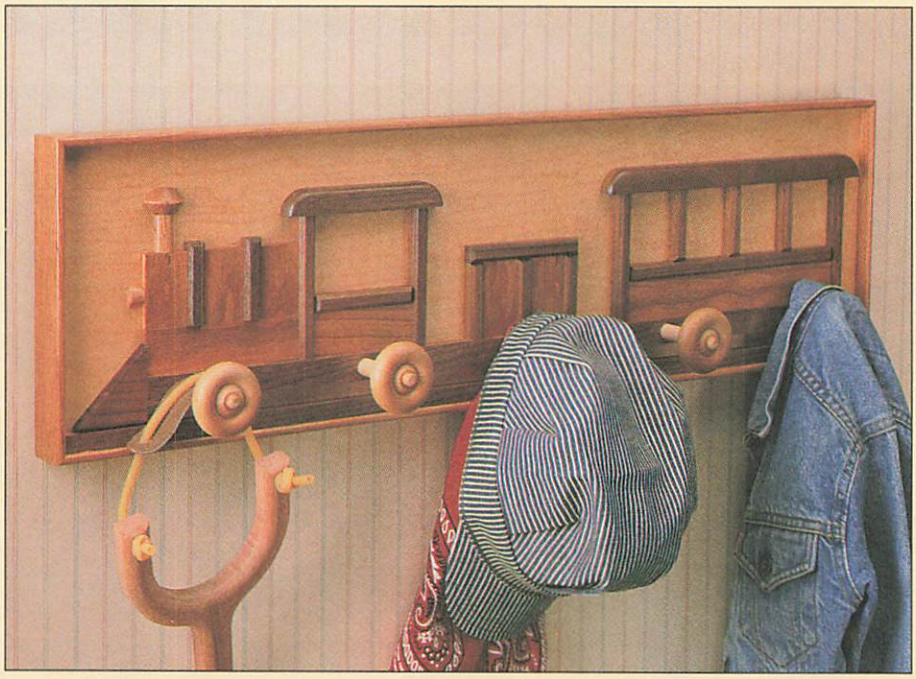


Cut the strips the same length with an auxiliary fence and stop block on the miter gauge.

Mark the position of all the notches, then cut them one at a time on all the divider pieces.

Child's Clothes Rack

When you're faced with cutting dozens of small parts, you have to think about safety as well as consistency. Cutting one piece at a time from a long strip is the only way to go.



My first impression of this Coat Rack was that building it would be like working on a jig-saw puzzle . . . and I was faced with the prospect of cutting lots of small parts that had to fit together perfectly.

To simplify things, I laid out all the small parts so they could be cut from five strips of wood. As I needed a part for the train, I cut it off one of the strips, just like a butcher cutting off slices of salami.

Two of the pieces (the smokestack and the wheels) can't be cut off the strips, they have to be turned on a lathe, or purchased pre-made. (See Sources, page 31.)

WOOD. The choice of wood for each of the parts was done to give it some depth and contrast to the background. Since I used light-colored plywood (birch) for the background, I chose darker woods (walnut and cherry) for the train pieces so they would stand out.

Since I used purchased pieces for the smokestack and lamp (and they only come in maple), I stained them to match the other cherry parts.

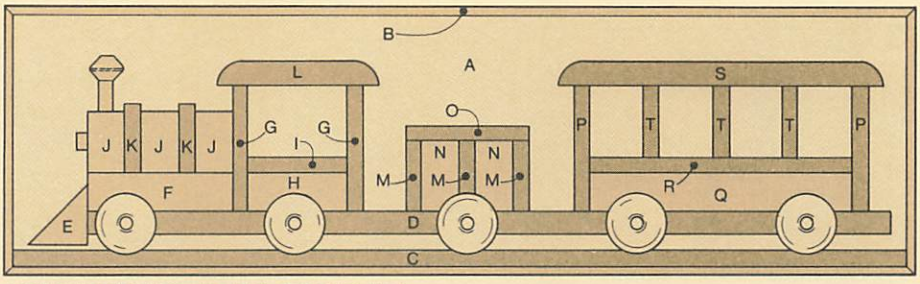
GLUE. I used a quick setting "super" glue to mount the parts to the background. I wanted to make sure the small parts wouldn't slip around as the glue dried.

FINISH. After the Coat Rack was assembled, I sprayed on two very light coats of Deft Semi-Gloss Clear Wood Finish. Using light coats of a spray finish is great to finish a project like this — you don't have to worry about getting runs and build-up in all the little nooks and crannies.

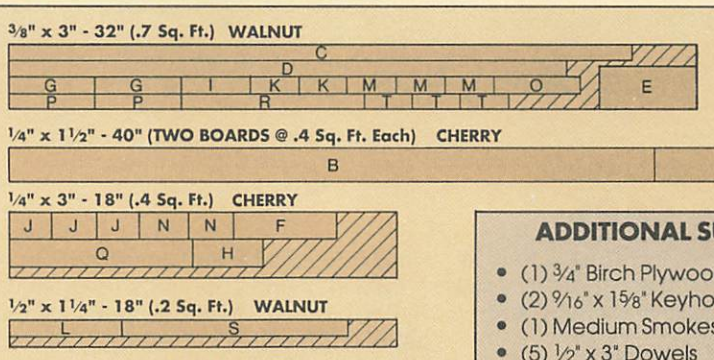
MATERIALS

BASE		
A	Background (1)	¾ ply - 8 x 29
B	Edging (2)	¼ x 1⅜ - 40 (rgh)
C	Rail Bed (1)	⅜ x ½ - 29
D	Carriage (1)	⅜ x ¾ - 26⅛
ENGINE		
E	Cow Catcher (1)	⅜ x 2 - 2
F	Boiler Base (1)	¼ x 1¼ - 4¾
G	Cab Bands (2)	⅜ x ½ - 4
H	Cab Side (1)	¼ x 1¼ - 3¼
I	Railing (1)	⅜ x ½ - 3¼
J	Boiler Sections (3)	¼ x 1¼ - 2
K	Boiler Bands (2)	⅜ x ½ - 2¼
L	Roof (1)	½ x ¾ - 5¼
TENDER		
M	Bands (3)	⅜ x ½ - 2¼
N	Sides (2)	¼ x 1¼ - 2¼
O	Railing (1)	⅜ x ½ - 4
COACH		
P	Bands (2)	⅜ x ½ - 4
Q	Side (1)	¼ x 1¼ - 8½
R	Railing (1)	⅜ x ½ - 8½
S	Roof (1)	½ x ¾ - 10½
T	Window Dividers (3)	⅜ x ½ - 2¼

PARTS DIAGRAM



CUTTING DIAGRAM


⅜" x 3" - 32" (.7 Sq. Ft.) WALNUT
C
D
G G I K K M M M O
P P R T T T
E
¼" x 1½" - 40" (TWO BOARDS @ .4 Sq. Ft. Each) CHERRY
B B
¼" x 3" - 18" (.4 Sq. Ft.) CHERRY
J J J N N F
Q H
½" x 1¼" - 18" (.2 Sq. Ft.) WALNUT
L S

ADDITIONAL SUPPLIES

- (1) ¾" Birch Plywood - 8" x 29"
- (2) 9/16" x 1⅝" Keyhole Hangers
- (1) Medium Smokestack
- (5) ½" x 3" Dowels
- (5) ⅝" x 2" Wheels
- (5) ⅜"-Dia. Axle Pins

TRAIN BASE

The easiest way to build this project is by starting with a base and edging. Then the individual train pieces can be attached to the base like a jigsaw puzzle on a card table.

BASE. To build the base, first cut a piece of ¾" plywood for the **background (A)** to finished dimensions, see Fig. 1. Then mount wall hangers on the back side. (I used keyhole hangers. To install them, refer to Shop Notes on page 17.)

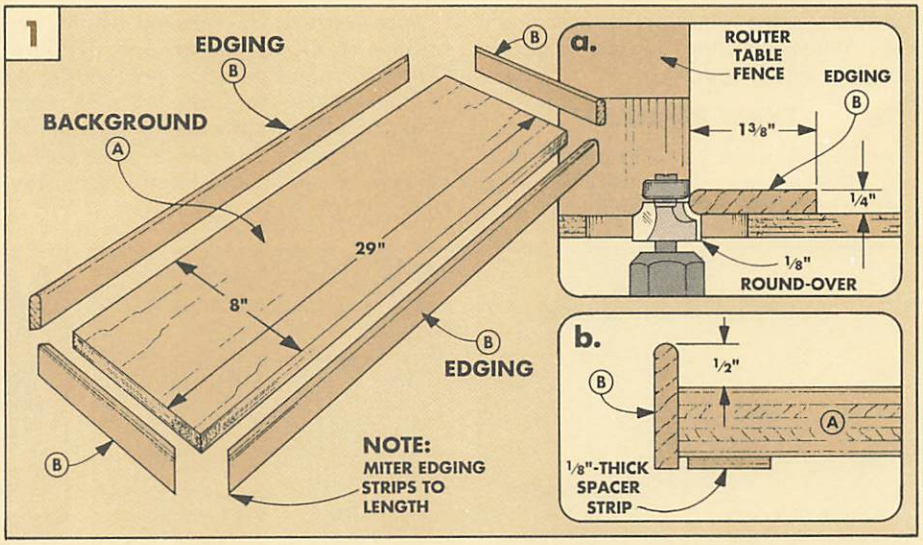
EDGING. To cover the exposed edges of the plywood and to frame in the train, next add a ¼"-thick strip of edging around the plywood, see Fig. 1. (I used cherry for this.)

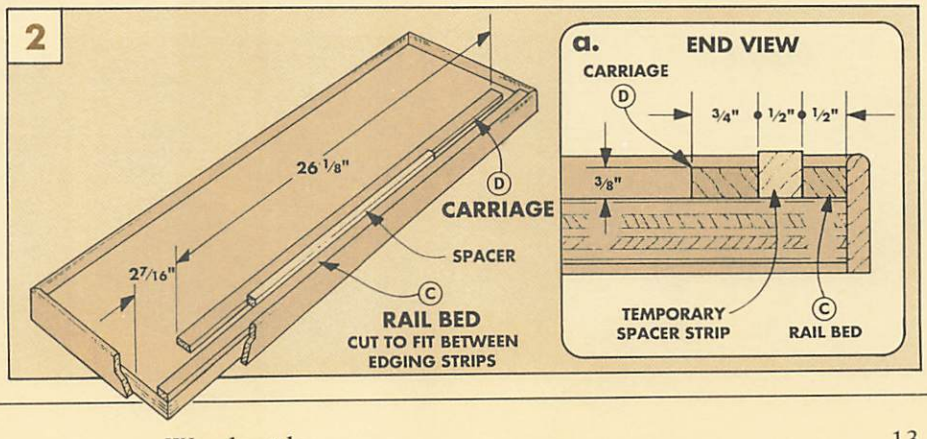
To do this, start with a 1⅜"-wide blank and round over the front edge, see Fig. 1a. Now, cut the blank into four strips to fit around the base and miter the pieces to length. Next, glue the strips in place around the base.

Note: When gluing on the strips, there should be a ½" overhang on the *front* for the train pieces, and a ⅛" overhang on the *back* for the hangers. So to make positioning the strips easier, I laid the base *face up* on ⅛" Masonite spacers, see Fig. 1b.

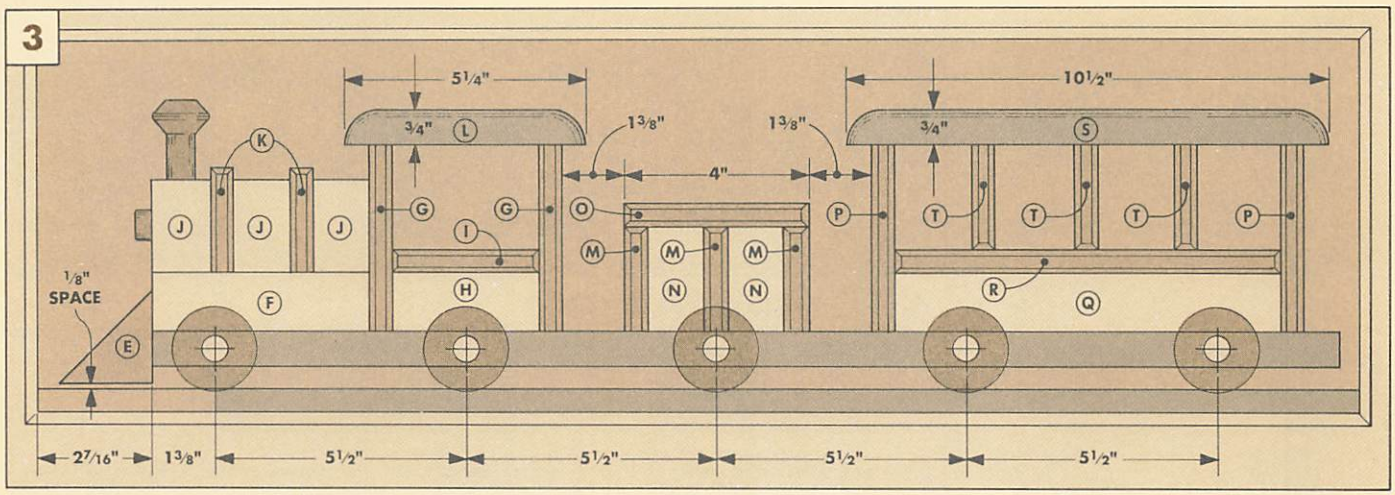
RAIL BED. Now the background can be prepared for the train. To do this, first cut a piece of ⅜"-thick stock (I used walnut) for the **rail bed (C)** to fit between the end edging strips, see Fig. 2. Then glue it down so it's flush to the bottom edging strip.

CARRIAGE. Now cut another piece of walnut for the **carriage (D)**, see Fig. 2. To get a uniform gap, I used a temporary spacer when gluing the carriage in place.





DIMENSIONAL PLAN



ENGINE & CARS

Now the base is ready for the train. I cut the parts for the train as they were needed and constructed it in a front-to-back direction.

COW CATCHER

The first part of the train to make is the **cow catcher (E)**. I bandsawed this part from a block of ¼"-thick walnut, see Fig. 4.

To position the cow catcher on the base, I used a piece of ⅛" Masonite as a spacer, see Fig. 3. When gluing the cow catcher in place run the grain horizontally.

THREE BLANKS

Now that you're sure bovines won't get in the way (they can make things a little crowded in the shop), you can cut the five strips of wood for the remaining parts of the train.

CHERRY PARTS. The parts used for the **boiler base (F), boiler sections (J)**, and **sides (H, N, Q)** are all cut from ¼"-thick cherry, see Fig. 3 and refer to the Cutting Diagram. First cut two strips of cherry (1¼" x 18" rgh.) for these parts. Then as each part is needed, cut it from one of the strips and glue it in place.

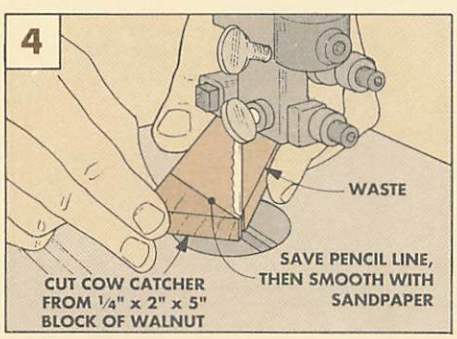
WALNUT PARTS. The **bands (G, K, M, P), railings (I, O, R)**, and **window dividers (T)** are cut from ⅜"-thick walnut, see Fig. 3.

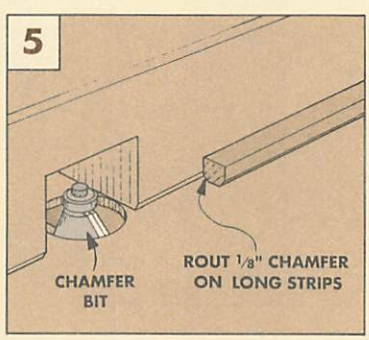
To make these parts, rip a 1¼" x 26" piece of walnut into two strips (½" wide), refer to Cutting Diagram. To dress up these parts a bit, I routed a ⅛" chamfer along the outside edges of both strips, see Fig. 5.

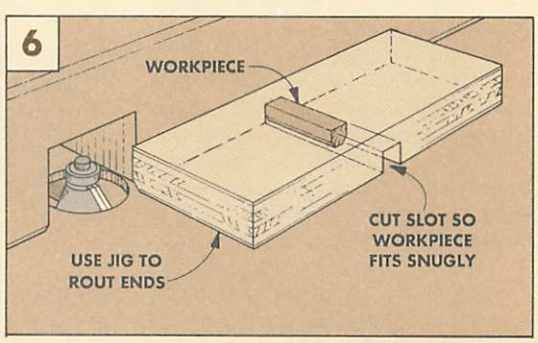
As soon as you remove a piece from either of these strips for the boiler band (K), tender band (M), or window divider (T), chamfer *one* of the ends, see Fig. 6. When removing a piece for a railing (I, O, R) chamfer *both* ends. Note: The cab bands (G) and coach bands (P) aren't chamfered at either end.

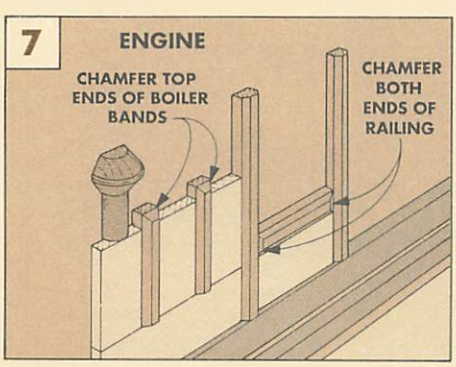
SANDING PARTS. Because the parts are so small and positioned close together, I found it a whole lot easier to first sand the parts before gluing them to the background.

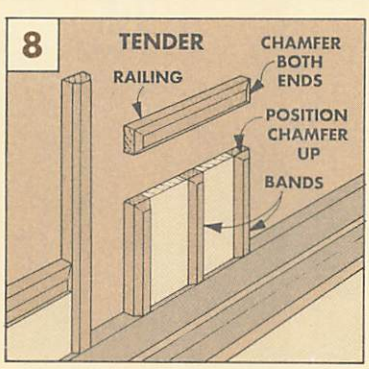
Design Note: When you're gluing the boiler bands (K) and tender bands (M) in place, position the end with the chamfer *up*, see Figs. 7 and 8. And when you're gluing the window dividers (T) in place, position the end with the chamfer *down*, see Fig. 9.

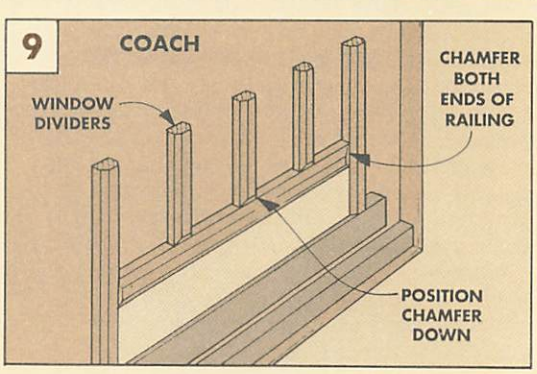












CONTINUED

ROOF PIECES. The **engine roof (L)** and the **coach roof (S)** are both cut from a strip of ½"-thick walnut, see Fig. 10 and refer to the Cutting Diagram.

Once a roof (L, S) is trimmed to length, bandsaw a ¾" radius at each end, see Fig. 10. Next, smooth over the roofline by routing a ¼" round-over along the top edge of the roof, see Fig. 10a. Then glue the roofs in place.

SMOKESTACK & LAMP

Without a lathe, the easiest way to get a realistic-looking smokestack is to buy it premade. (See Sources, page 31.)

SMOKESTACK. To make the smokestack work for this coat rack, I had to cut it in half on the band saw. And to do this safely and accurately, I used a piece of 2x4 as a jig to hold it in place, see Fig. 11.

Prepare the 2x4 by drilling a hole in one end that's the same diameter as the base on the smokestack. Then insert the smokestack in the hole.

Next, position the rip fence so that a ¼"-thick section of the base on the smokestack will be produced, see Fig. 11a. As you're cutting, be sure to push the smokestack all the way through the saw blade.

LAMP. Once the smokestack is split, trim off a small portion of the base for the lamp, see Fig. 11a.

Since I wanted these two parts to match the cherry parts on the train, I applied a coat of cherry stain before gluing them in place.

AXLES & WHEELS

To help the kids keep their things hung up on the rack, I used the train's wheels as the "hooks." I did this by extending the wheels with 3"-long dowels as axles.

To attach the axles to the train, first drill five ½"-dia. holes along the carriage (D), see Figs. 3 and 12. Then glue the dowels in place.

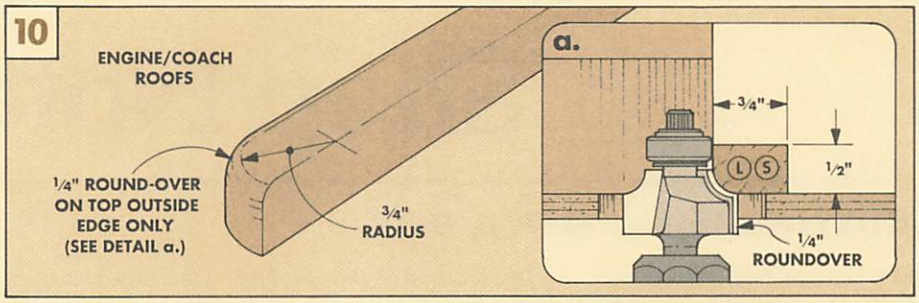
JIG. Because my wheels came with a ¼" axle hole, I had to bore out the backside of each wheel to accept the ½"-dia. dowels. To drill the hole exactly centered, I made a jig consisting of a piece of plywood and a ¼" dowel pin, see Fig. 13.

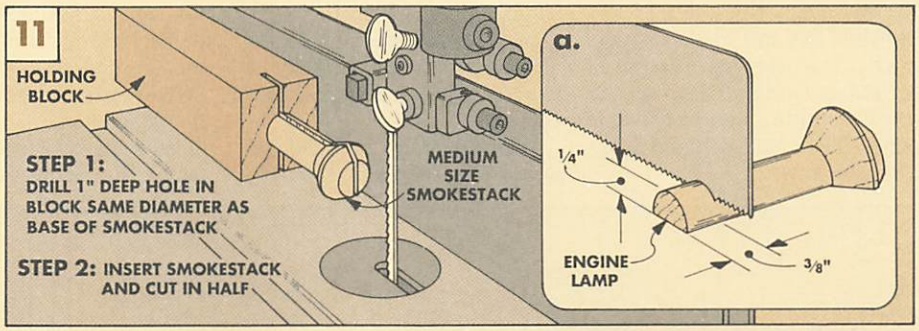
To build the jig, first clamp the plywood to the drill press table. Then drill a ¼"-dia. hole through the board. Next, insert a short length of ¼" dowel into the hole. And replace the ¼" bit with a ½" Forstner bit.

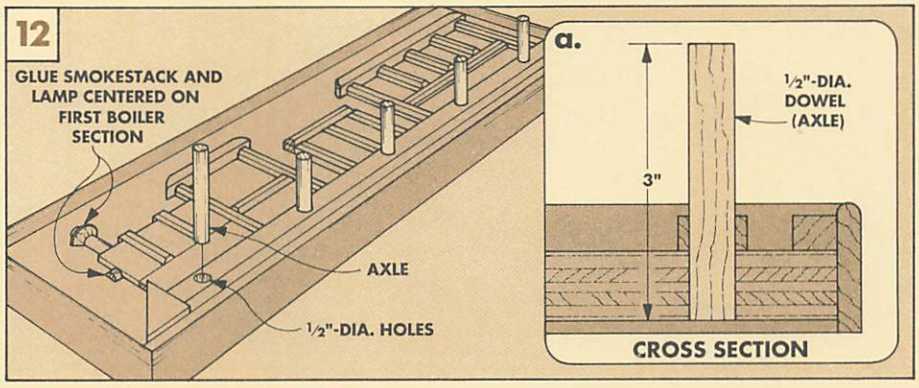
To use the jig, first place a wheel *face down* on the dowel, see Fig. 13. Then drill a ⅜"-deep counterbored hole in the back of the wheel.

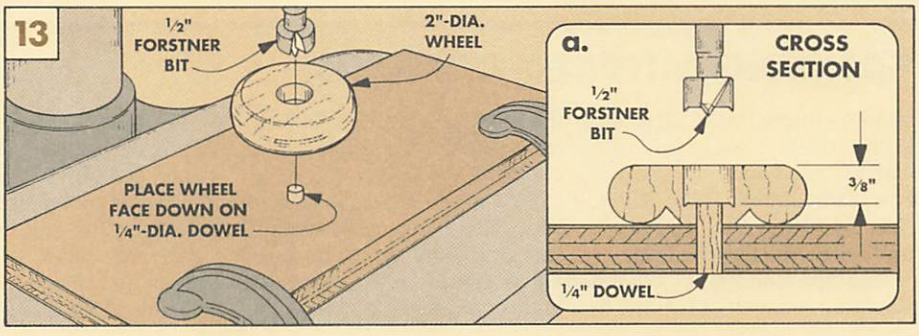
Once all the wheels have been counterbored, glue them to the axles, see Fig. 14.

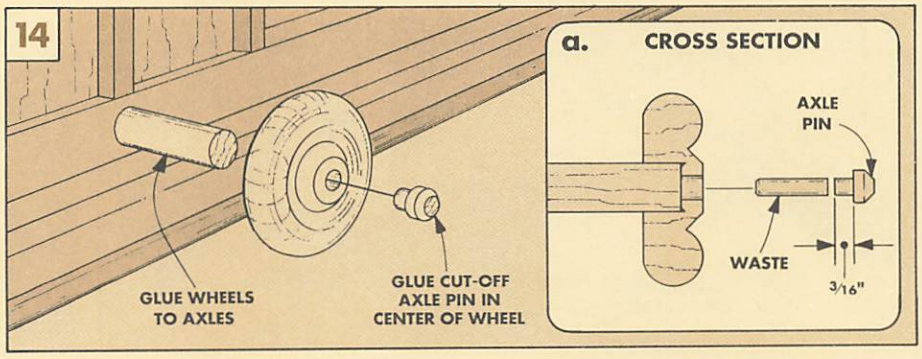
AXLE PINS. To complete the coat rack, plug the ¼"-dia. axle hole on the front of each wheel, see Fig. 14. To do this, just trim off a small portion of an axle pin to fit the hole, see Fig. 14a. Finally, glue the pins in place and apply the finish.











Shop Notes

CUTTING A LID OFF A BOX

■ When making a box with a lid, such as the Chess Board on page 6, you want the sides of the finished box and lid to align perfectly. The best way to do this is to first assemble all the pieces of the box: the top, bottom and four sides. Then cut off the lid using the table saw.

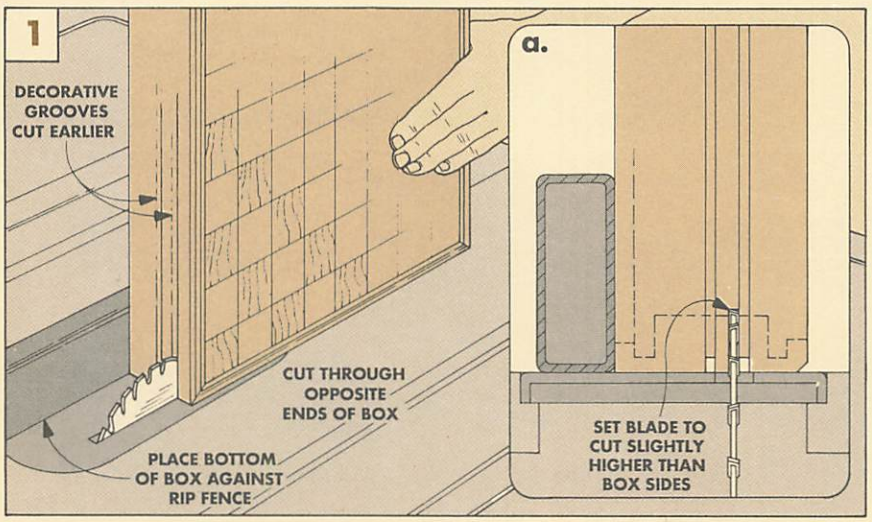
To cut the lid off the box, first set the height of the saw blade slightly higher than the thickness of the box sides, see Fig. 1a. Then position the rip fence so the lid will be cut off right where you want it.

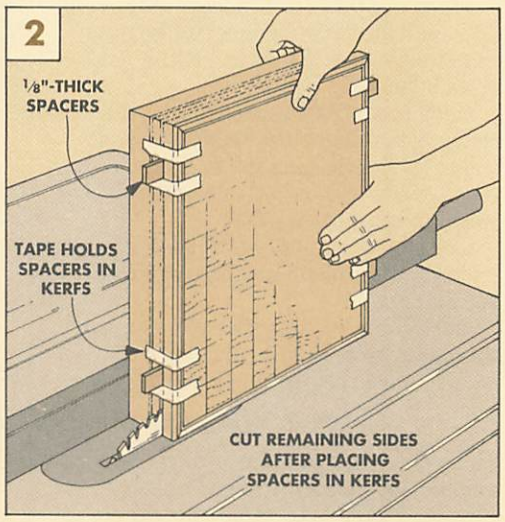
With the fence and blade adjusted properly, place the bottom of the box against the fence and begin cutting the lid off the box, see Fig. 1. But there's a trick to this. First cut through the two opposite ends, and stop.

To keep the lid from pinching the blade on the last two cuts, I slide two pieces of ⅛"-thick Masonite (the same thickness as the width of the saw kerf) through the box from one kerf to the other, see Fig. 2.

Then I put strips of tape above and below the pieces of Masonite to keep them from slipping, see Fig. 2.

Now make the last two passes to complete cutting off the lid.


1
DECORATIVE GROOVES CUT EARLIER
a.
CUT THROUGH OPPOSITE ENDS OF BOX
PLACE BOTTOM OF BOX AGAINST RIP FENCE
SET BLADE TO CUT SLIGHTLY HIGHER THAN BOX SIDES



SANDING MITERED CORNERS

■ After cutting the lid off a box, such as on the Chess Board (see above), you'll want to sand the saw blade marks off the edges. But sanding the edges of mitered corners can be tricky.

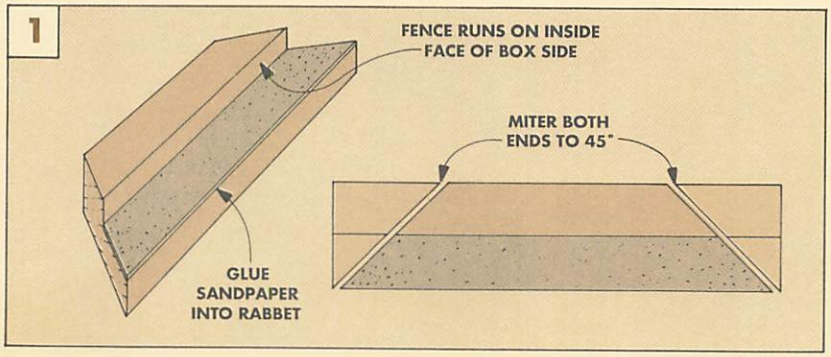
Rubbing sandpaper all the way from one end of the box to the other would result in sanding across the grain of the adjoining mitered ends.

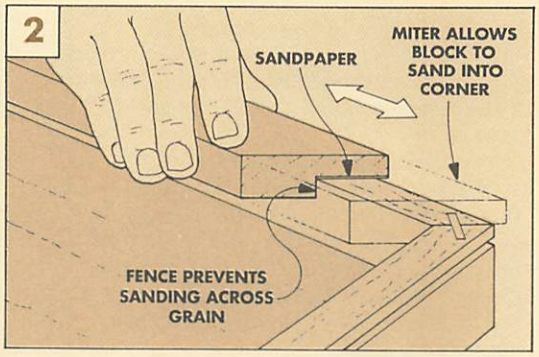
So I made a sanding block with mitered ends. This way I can sand right up to the miter line without sanding across the grain of the adjoining piece.

To make a mitered sanding block, cut a rabbet in a piece of scrap, see Fig. 1. One "wall" of the rabbet provides a flat surface to attach the sandpaper. The other wall (at 90° to the first) serves as a fence to guide the sanding block along the inside face of the workpiece, see Fig. 2.

After the rabbet is cut, you can miter the ends to 45°, see Fig. 1.

Finally, glue a piece of sandpaper to the wide face of the rabbet. This is a great place to use Stikit or another adhesive-backed sandpaper.





INSTALLING KEYHOLE HANGERS

■ When it was time to hang the Child's Clothes Rack on page 12, I used keyhole hangers. They are designed to hold a cabinet or rack tightly against a wall, and they can support a substantial amount of weight. (The name comes from the shape of the slot in the hangers — it looks like a keyhole, refer to Fig. 1a.)

The wide part of the slot allows the head of a screw to pass through. But the narrow top end of the slot is only wide enough for the shank behind the screw head. This way the hanger fits over the head of the screw and locks on the shank.

To install a pair of keyhole hangers, start by drilling two shallow holes (⅛" deep) on the back of the rack, see Fig. 1. These holes provide enough clearance for the screw heads.

Next, center the hangers over the holes, and screw the hangers in place.

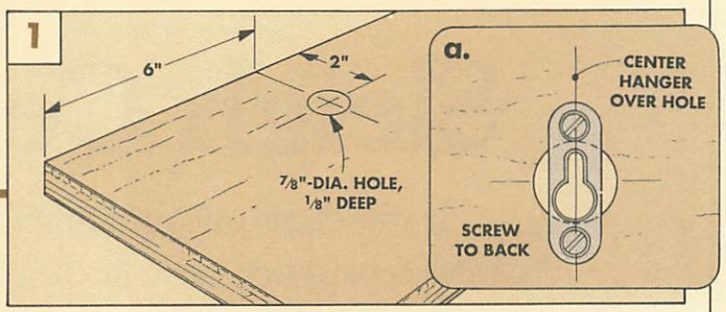
Once the hangers are attached, the next step is to mark the location on the wall for the screws on which the rack will hang. I use a simple method to transfer the position of the hangers onto the wall.

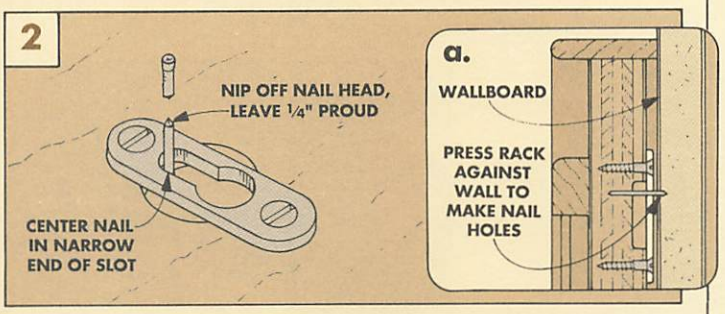
To do this, partially drive a small finishing nail into the narrow end of each hanger slot, see Fig. 2. Then nip off the ends of the nails leaving them ¼" proud of the hanger.

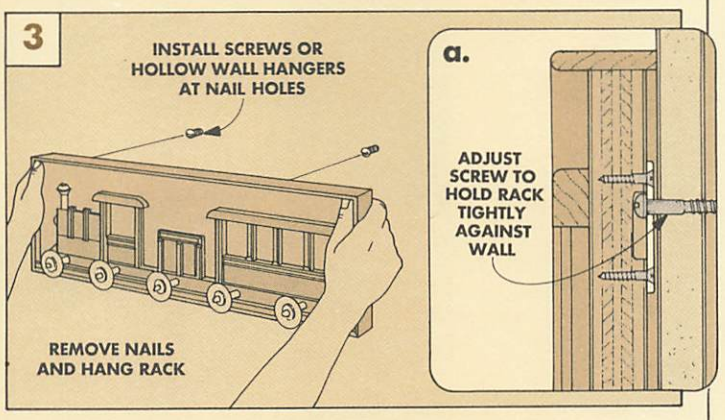
Now hold the rack up to the wall where you want it to hang. Then level it and press the rack against the wall to leave small nail holes, see Fig. 2a.

Next, install screws (if the hangers are over studs) or hollow wall fasteners (if it's over a hollow wall) at the nail holes.

Finally, remove the nails from the back of the rack with a pair of pliers, and hang the rack on the wall, see Fig. 3. (It may take a little trial and error to determine how far to drive the screws in the wall so the rack will fit tightly over the screw heads and against the wall, see Fig. 3a.)






3
INSTALL SCREWS OR HOLLOW WALL HANGERS AT NAIL HOLES
REMOVE NAILS AND HANG RACK
a.
ADJUST SCREW TO HOLD RACK TIGHTLY AGAINST WALL

ROUTING A SMOOTH EDGE

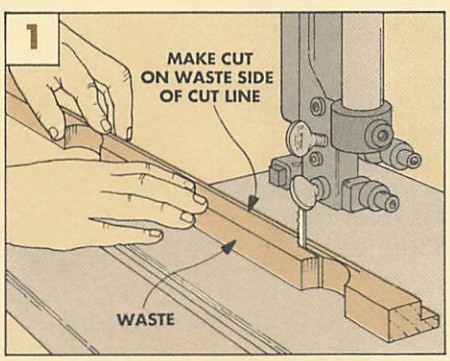
■ To create the look of feet on the corners of the Chess Board (see page 6), I cut out an area on the bottom edge of the base molding pieces. First I drilled holes, then I roughed out the waste on the band saw, cutting ⅛" on the waste side of the line, see Fig. 1. The band saw leaves a ragged edge between the holes.

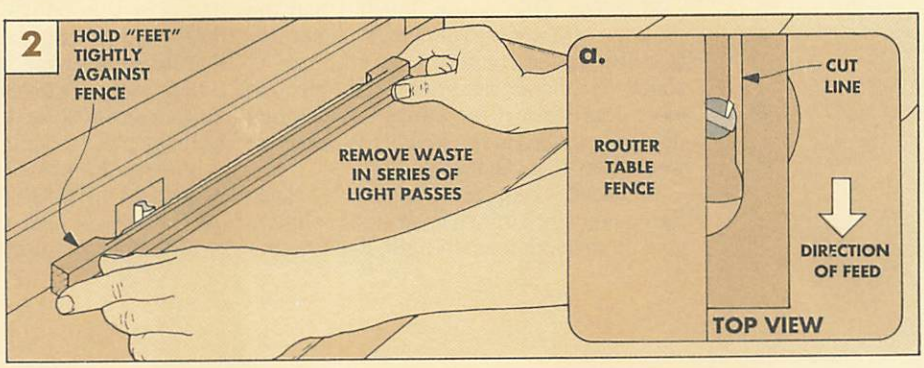
To smooth and straighten this edge, and clean up to the final line, I use a router table.

To do this, start by mounting a straight bit in the router table, see Fig. 2. Set the fence so the outside of the bit just trims the stock, see Fig. 2a. (Safety Note: *Never* trap a workpiece between the bit and the fence. It can grab and kick back.)

Now, hold the "feet" of the workpiece firmly against the fence, and slide the workpiece from right to left. Note: The fence has to be twice the length of the workpiece to provide a surface for the feet to run on.

To avoid chatter and produce a smooth edge, rout out the waste in a series of light passes, sneaking up on the final line.





Sleigh Centerpiece

If you've ever wanted to try bent lamination, the runners on this centerpiece might be the place to begin. And you don't have to be a metalsmith to deal with the decorative brass parts.

An heirloom project doesn't have to be big, it just has to have some special attention behind it. As you look closely at the amount of detail in this Sleigh Centerpiece, it's easy to see how it will be admired for many holidays to come.

RUNNERS. One of the details I had the most fun with was the runners. The easy way to make curled runners is to cut them to shape on a band saw from a solid piece of wood. But if they're made this way, the grain direction on the curved front ends will cause weak spots that can easily split.

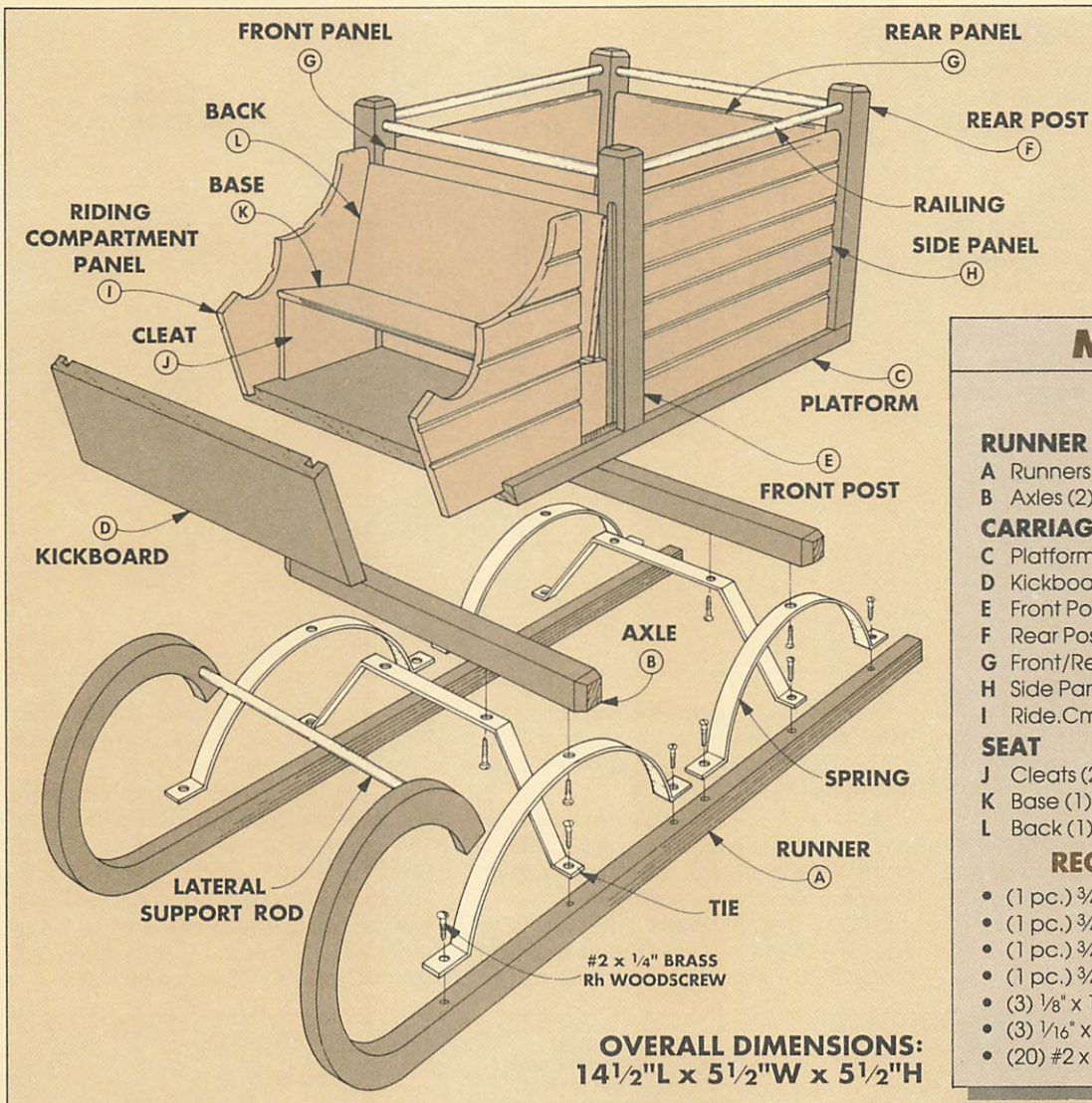
Although it requires more effort, I made the runners by laminating strips of walnut to give them maximum strength. Each runner is glued up from five thin strips. Then they're bent around a piece of PVC pipe to give them their shape.

WOOD & BRASS. From the runners up, I wanted to build what would look like a scale model of a sleigh. I used polished brass strips for the springs and ties, and polished brass rods for the railings. (For sources of hardware, see page 31.)

The sides are made from pine that's carefully resawn to ⅛"-thick. These sides are actually mortised into the walnut posts.

FINISH. To preserve the beauty of the wood and the brass, I sprayed on two coats of Deft Semi-Gloss Clear Wood Finish to seal all the parts, even the brass.

EXPLODED VIEW



MATERIALS

PARTS LIST

RUNNER ASSEMBLY

A	Runners (2)	¼ x 5/16 - 20½ rgh
B	Axles (2)	⅜ x ⅜ - 5½

CARRIAGE

C	Platform (1)	¼ x 5 - 8⅝
D	Kickboard (1)	¼ x 5 - 1⅝
E	Front Posts (2)	⅜ x ⅜ - 3½
F	Rear Posts (2)	⅜ x ⅜ - 3½
G	Front/Rear Panel (2)	⅛ x 2⅞ - 4⅜
H	Side Panels (2)	⅛ x 3 - 6
I	Ride.Cmpt. Pnls. (2)	⅛ x 3 - 3⅜

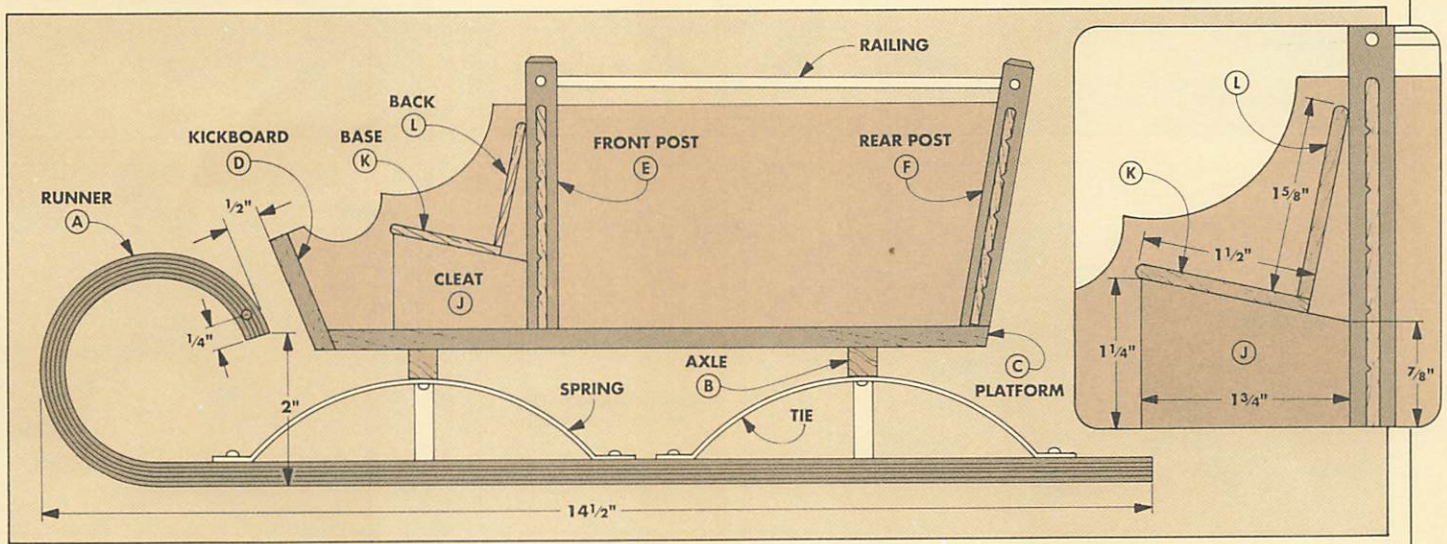
SEAT

J	Cleats (2)	⅛ x 1¼ - 1¾
K	Base (1)	⅛ x 1½ - 4½
L	Back (1)	⅛ x 1⅝ - 4½

REQUIRED SUPPLIES

- (1 pc.) ¾" x 1½" - 24" Walnut
- (1 pc.) ¾" x 5" - 12" Walnut
- (1 pc.) ¾" x 2" - 12" Walnut
- (1 pc.) ¾" x 3" - 10" Pine
- (3) ⅛" x 12" Brass Rod
- (3) 1/16" x ¼" - 12" Brass Strip
- (20) #2 x ¼" Brass Rh Woodscrews

CROSS SECTION



RUNNER ASSEMBLY

The Sleigh Centerpiece has two main components — a runner assembly and a carriage. I started on the runner assembly by building the runners.

BENT LAMINATION

I made the runners from strips of walnut that are glued together and bent around a form, see Fig. 4. It's easiest to make one wide blank and then rip the two runners from it.

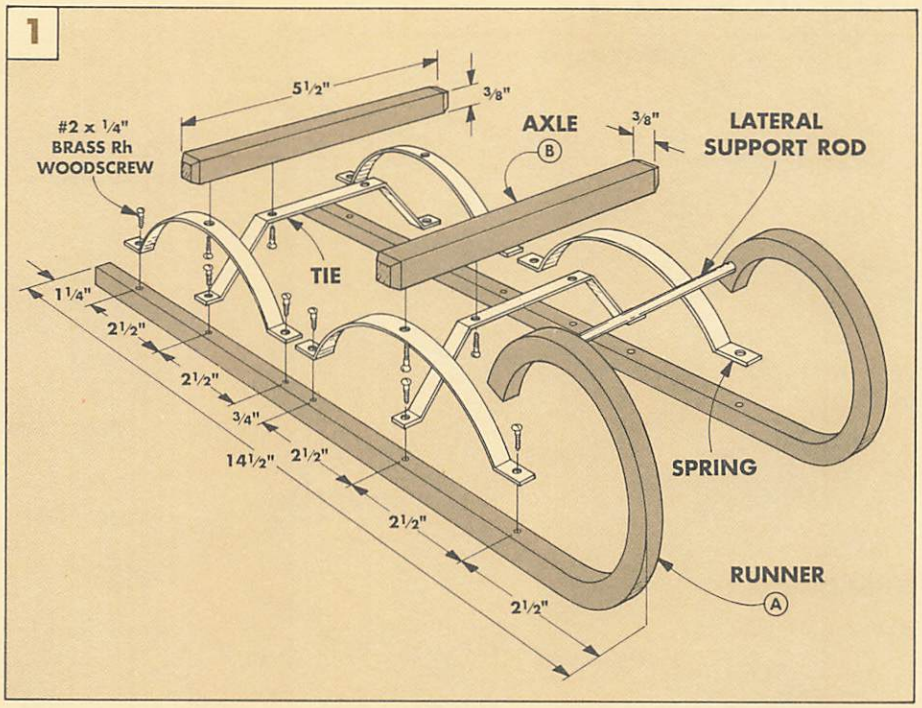
To make the blank, rip five 1/16"-thick strips off a piece of 3/4"-thick stock. Once the strips are cut, the next step is to pre-bend them around a form.

FORMS. To shape the curled end of the runners, you need a round inner form, and a pressure block to press the strips against the form. I used a short piece of PVC pipe as the inner form and a piece of larger diameter PVC pipe for the pressure block, see Fig. 2.

But before the strips can be wrapped around the form, they first must be wet-bent.

WHY WET-BEND? If a strip of dry wood is bent around a form with a tight radius it could splinter at the edges or even break. To prevent this, soak the strips in hot water for about an hour to soften the wood fibers. When the strips are pliable, they're ready to be wrapped around the form.

WET-BEND STRIPS. After the strips have been soaked, stack them on top of one another. Then drill a hole at one end of the stack and screw the stack to the smaller PVC pipe, see Fig. 2. Now, bend the stack *slowly* around the pipe. Note: Don't apply any glue.



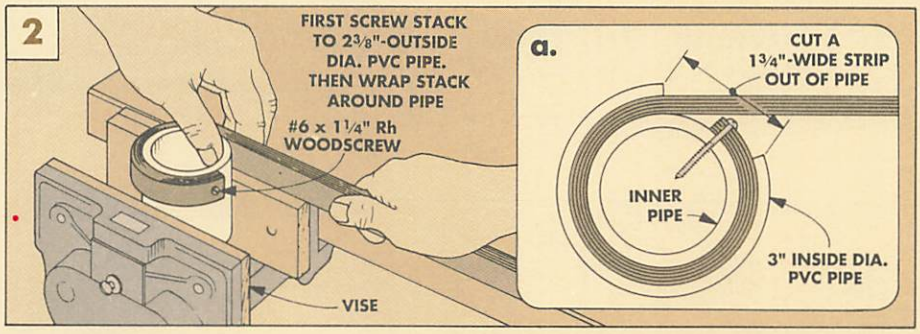
Once you've wrapped the stack, slip the larger diameter pipe over the stack, see Fig. 3. Then clamp the strips tight between the two pieces of pipe, see Fig. 4.

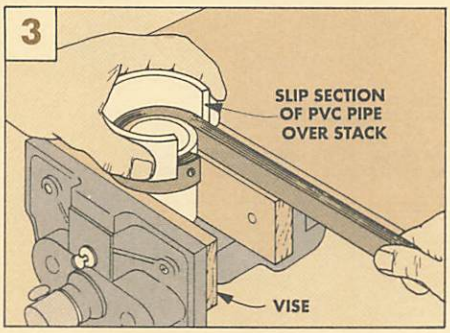
GLUE-UP. When the strips are completely dry, remove the clamps. Then apply a liberal amount of glue to each strip, and clamp up the entire blank again, see Fig. 4.

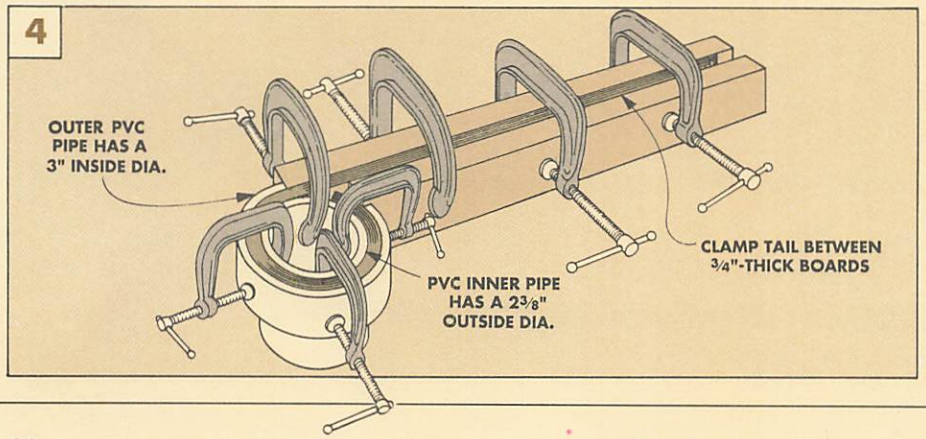
RIPPING THE RUNNERS. After the glue dries overnight, remove the clamps and scrape off the excess glue. (It may also be necessary for you to smooth up the sides with a hand plane or scraper.) Then rip the **runners (A)** to width, see Fig. 5.

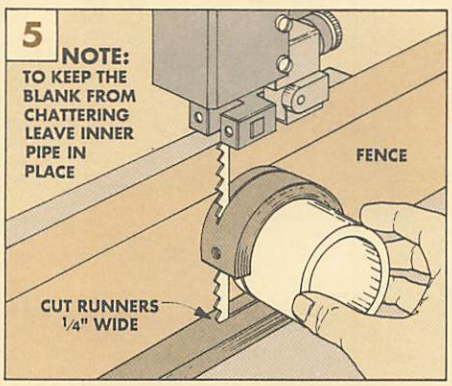
Now, cut the runners to length and trim the curled ends, refer to Cross Section, page 19. Finally, sand the edges smooth, and drill holes for a lateral support rod, see Fig. 1.

AXLES. The runners are connected with brass ties and two axles (B), see Fig. 1. Cut the **axles (B)** to final dimensions, and chamfer the ends with a sanding block.


2
FIRST SCREW STACK TO 2 3/8"-OUTSIDE DIA. PVC PIPE. THEN WRAP STACK AROUND PIPE
#6 x 1 1/4" Rh WOODSCREW
VISE
a.
CUT A 1 3/4"-WIDE STRIP OUT OF PIPE
INNER PIPE
3" INSIDE DIA. PVC PIPE







SPRINGS & TIES

The runners and axles are held together by a pair of ties and two pairs of springs, refer to Fig. 1. The springs and ties are made from 1/16"-thick brass strips.

SPRINGS. To make the springs, first cut four brass strips to a length of 6". Then drill holes for screws, see Template below. Note: To keep the drill bit from wandering around on the brass, I punched the hole with a nail punch before drilling.

Next, bend each bar into a 3"-radius curve, see Template. (When bending the bars, I over bent them just a little bit. Then I bent them back until they laid flat on the side of a three pound coffee can.)

When you're satisfied with the shape of the springs, mark where the bends near the ends are to be located, see Template. (I made the marks with an awl. And I placed the marks on the bottom side of the springs so they'd be hidden.) Once you've marked the corners, bend the brass, see photo.

ATTACHING SPRINGS. Now the springs can be attached to the axles. First position each spring 3/8" in from the end of the axle, see Fig. 6. Then drill a pilot hole and screw the spring to the axle.

TIES. To provide lateral support to the runner assembly, I added brass ties between the runners, see Fig. 7. To make the ties, first cut two brass strips to a length of 6". Then drill holes for the screws, see Template.

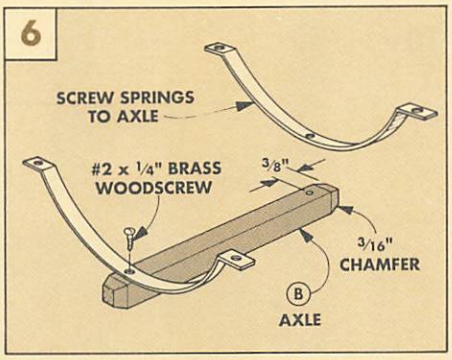
Now, mark the corners and then bend the ties to shape, see Template.

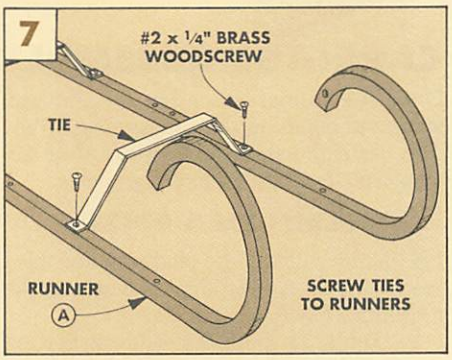
ATTACHING TIES. To attach the ties to the runners, first mark where the screws go in the runners, refer to Fig. 1. Then, align the holes in the ends of the ties with the marks on the runners, see Fig. 7. Now, drill pilot holes and screw the ties to the runners.

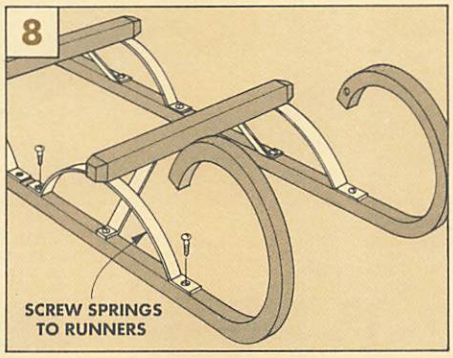
ASSEMBLY. Once both ties are attached, the runner assembly can be assembled. To do this, first center one of the axles directly over the front tie, see Fig. 8.

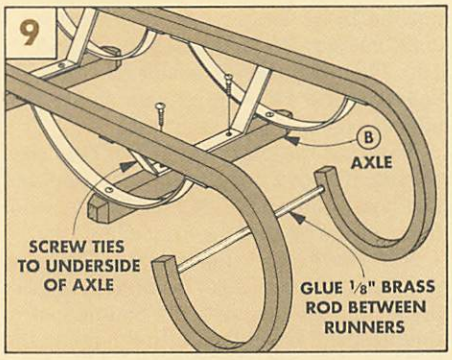
Next, adjust the springs until they're centered on the runners. When they're lined up, drill pilot holes and screw the springs to the runners. Now attach the rear axle.

To complete the runner assembly, drill pilot holes and screw the ties to the axles, see Fig. 9. Then, to dress up the runner assembly, cut a piece of 1/8"-dia. brass rod for a lateral support and glue it between the runners with epoxy.

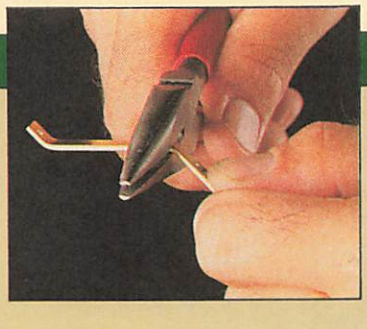


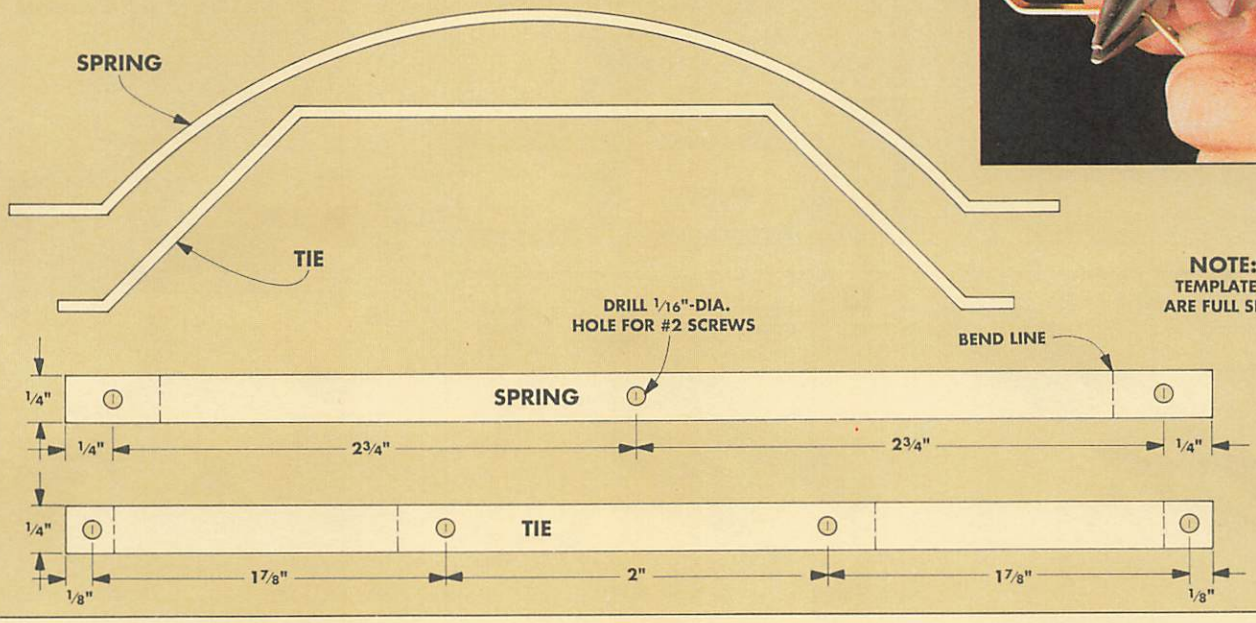






BENDING TEMPLATES





CARRIAGE ASSEMBLY

Once the runner assembly is complete, work can begin on the carriage assembly. The carriage assembly consists of an enclosed platform with four corner posts.

PLATFORM & POSTS

I began by building the platform. For this I resawed a piece of ¾"-thick walnut to make a ¼"-thick blank.

PLATFORM. To build the platform, first cut the 5"-wide blank to rough length (12"). (I cut the blank longer than necessary so I could use part of it for the kickboard, see Fig. 10.) Then, to provide a slot for the side panels, cut a ⅛"-wide groove along both edges of the blank, see Fig. 10a.

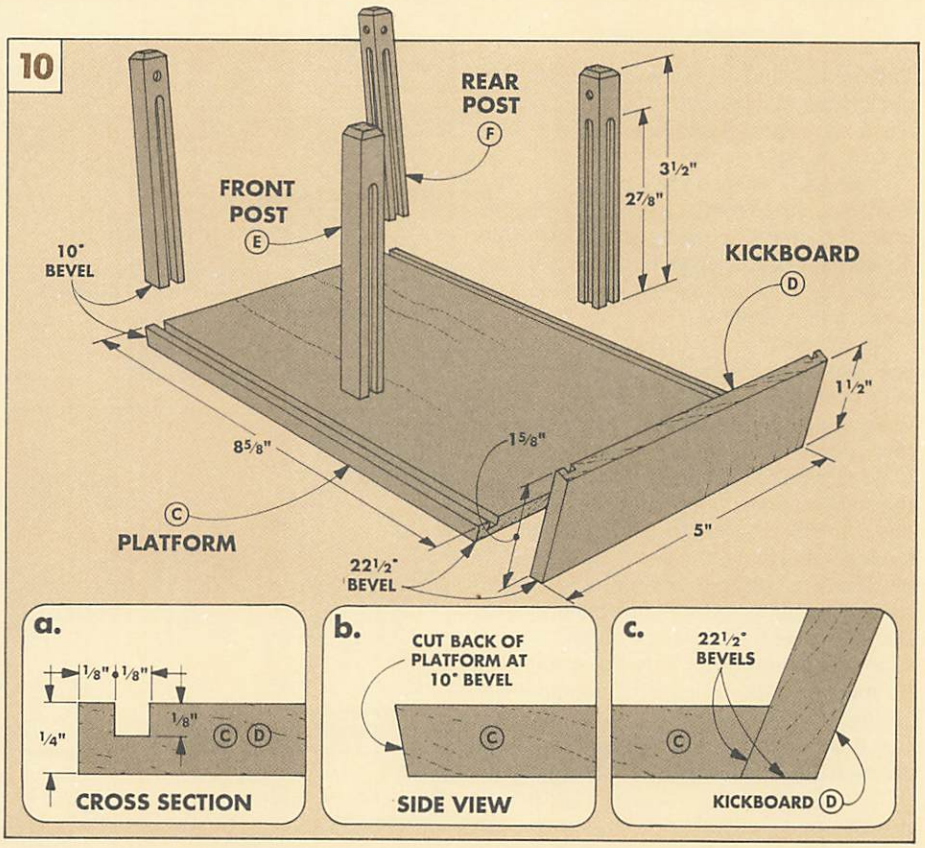
Next, cut the **platform (C)** to final size, see Fig. 10. Note: Because the rear panel and kickboard slope out, bevel the back edge of the platform 10° and the front edge 22½°.

Now cut the **kickboard (D)** to final size, see Fig. 10. Note: To get the bottom edge of the kickboard flush with the bottom face of the platform, bevel the bottom edge of the kickboard at 22½°. (The top edge of the kickboard remains at 90°.)

After the kickboard is cut to size, glue it to the front edge of the platform.

POSTS. To help support side panels and brass rails, I added four grooved posts, see Fig. 10.

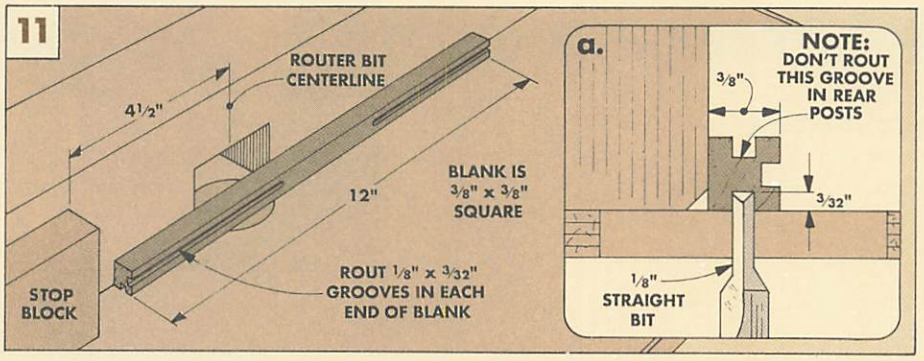
To make the posts, I started out with two 12"-long walnut blanks, see Figs. 11 and 12. I used one blank for the front posts (E) and the other blank for the rear posts (F).

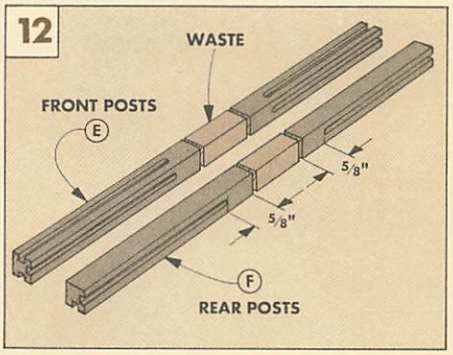


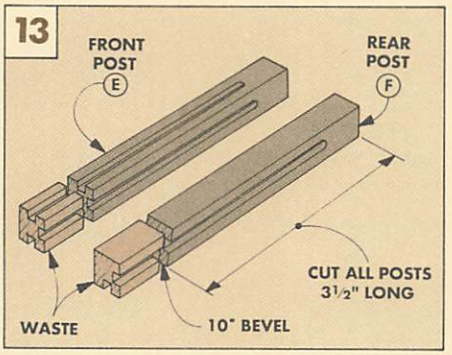
ROUTING GROOVES. To rout the grooves, I used a ⅛" straight bit and a stop block, see Fig. 11. Rout two grooves in the rear posts, and three grooves in the front posts.

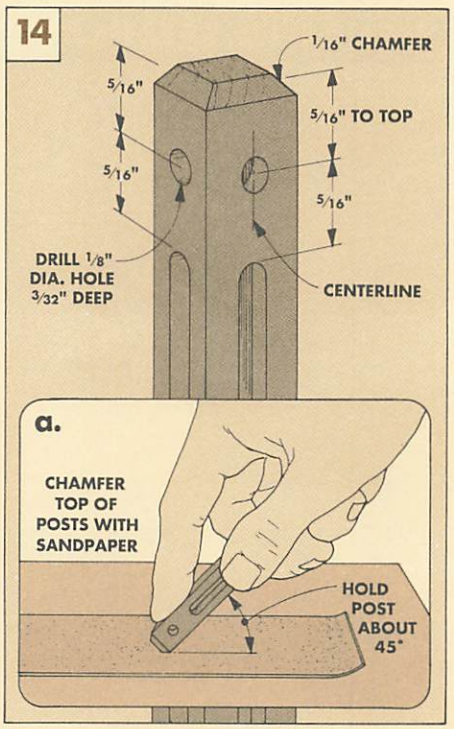
Now, cut the **posts (E, F)** to length, see Figs. 12 and 13. Note: The rear posts (F) are cut to length with a 10° bevel on the bottom.

To complete the posts, drill ⅛"-dia. holes for the brass rails, and chamfer the top ends, see Fig. 14. Note: Each post gets two holes drilled in it for the railings. Make sure to drill the holes on the *inside* faces of each post. Each set of posts (front and rear) is a mirrored set.









PANELS & SEAT

After the posts are complete, the storage and riding compartment panels can be made.

PANELS. To make the panels, I started out with a piece of ¾"-thick pine (3" x 10") resawn into four ⅛"-thick blanks. (I saved one blank for the seat.)

After cutting the blanks, the next step is to simulate wood planking on each blank.

V-GROOVES. To do this, rout five evenly spaced V-grooves on the *outside* face of each blank, see Fig. 15. An easy way to lay out the grooves is to use a ruler — but not the way you might think.

The way I laid out the grooves is to first place the 0" end of the ruler ⅛" up from the bottom edge of the blank, see Fig. 15a. (This allows ⅛" to fit in the platform grooves.) Then place the 3" mark at the top edge. Now, mark the grooves, and extend the marks to the end of the blank. (When laying out the grooves for the front and rear panels, place the 0" mark at the bottom edge of the blank.)

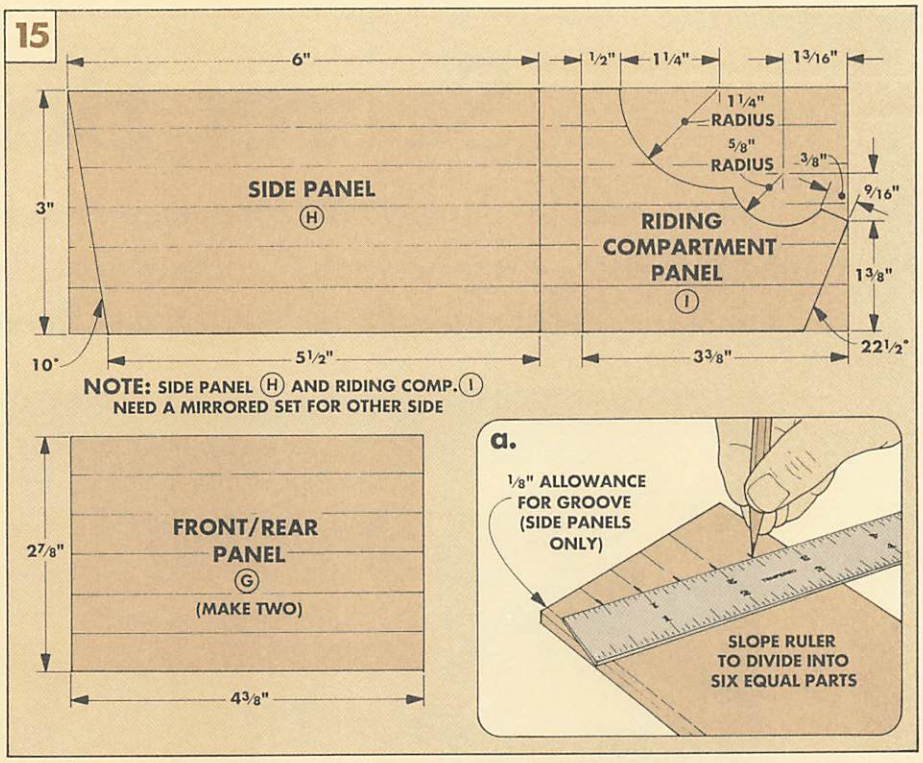
Then to rout each groove, move the router table fence until the tip of the V-groove bit lines up with the pencil mark, see Fig. 16a.

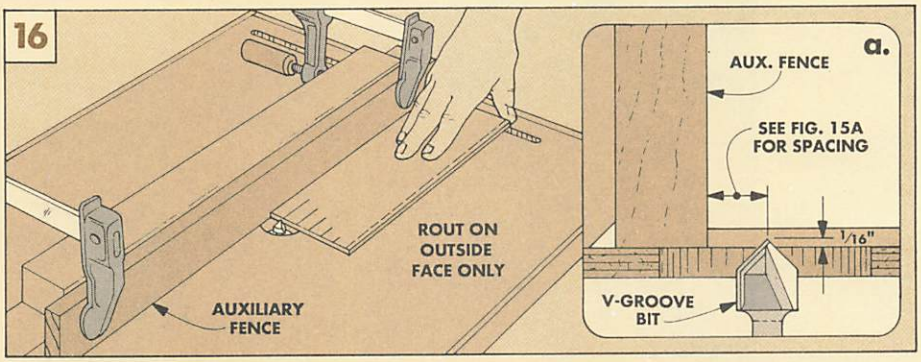
Once the V-grooves are routed, cut the **panels (G, H, I)** to length, see Fig. 15. And bandsaw the curved edges of the riding compartment panels (I).

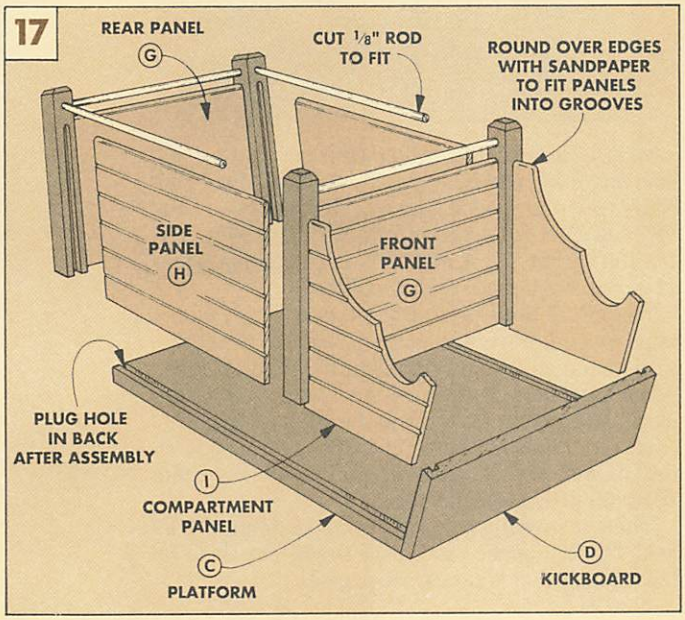
ASSEMBLY. Before glue-up, first dry assemble the carriage, see Fig. 17. Next, measure and cut four pieces of ⅛"-dia. brass rod for the rails. Then, reassemble *all* the parts — but this time use glue.

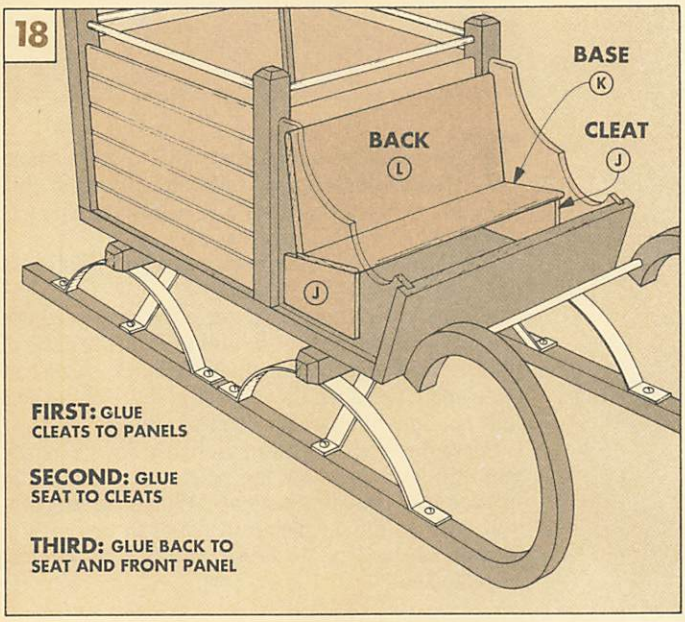
SEAT. Now cut the seat **cleats (J)**, **base (K)**, and **back (L)** to finished size, see Fig. 18 and refer to Cross Section, page 19. (For these parts I used the ⅛" pine saved earlier.) Then glue the parts for the seat in place.

Finally, glue the carriage assembly to the runner assembly, refer to page 19.









Secret Box

Inside and out, this looks like an ordinary jewelry box. But there's one difference — a secret drawer at the bottom. The real secret is in the joinery . . . tight miters for the frames, and grooves for sliding panels.

There must be a thousand ways to build a box. This one uses a type of frame and panel construction with short posts at the corners and panels that fit in grooves in the posts.

Not too unusual. What makes this box different is the "secret" drawer underneath.

WHAT'S THE SECRET? To get at the drawer, there are really two secrets. First, although all the parts of the box look like they're glued together, some can slide apart (because they're not glued). With carefully cut tight miters, this won't be obvious.

Second, even if you know there *are* moving parts, you still have to know the sequence to open the drawer. It's a two-step sequence. With the lid off, first you have to lift up the front panel to unlock the drawer, see inset photo above. Then the drawer can be pulled out.

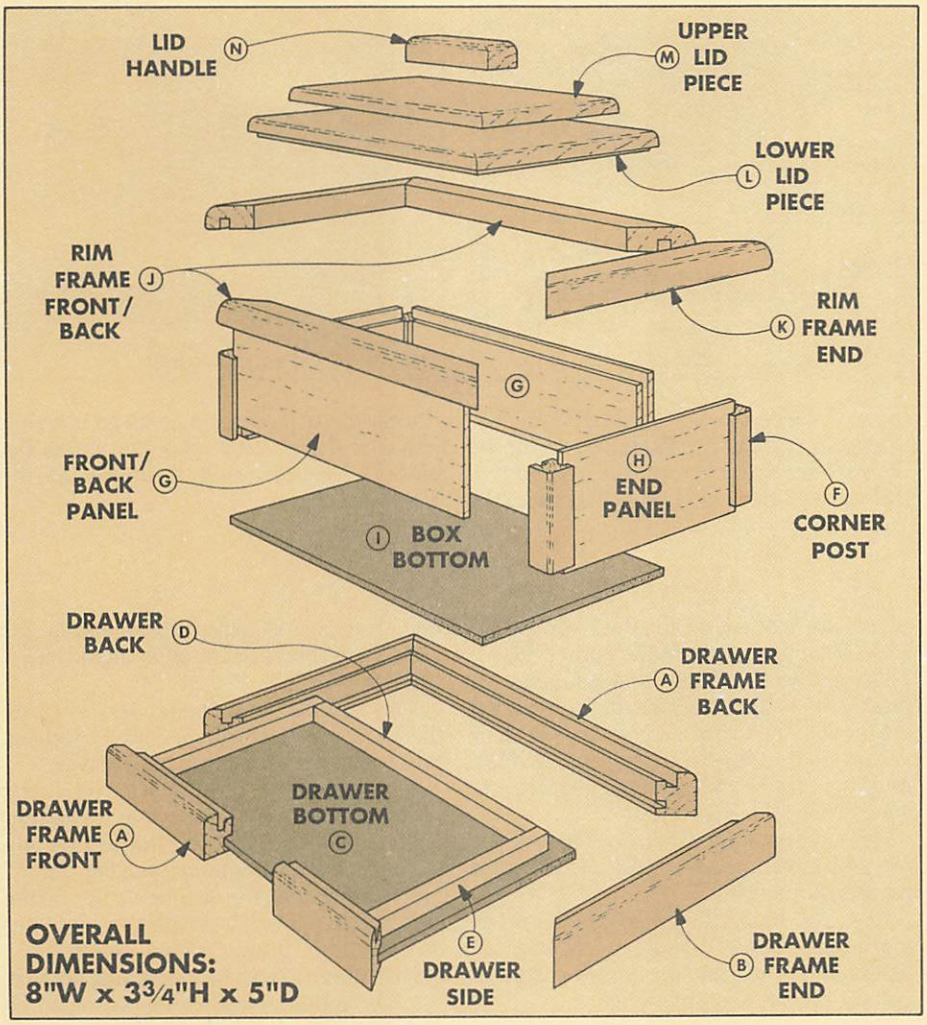
WOOD. Because this is a small project, it doesn't take much wood to build the Secret Box. About two board feet of hardwood, plus a couple small pieces of ⅛" Masonite. For the box shown here, I used cherry (for the frames, posts, and built-up lid), and quarter-sawn oak as a contrast (for the sides).

JOINERY. I used two basic joints on this box — tongue and groove, and miters. To make it safer to work the small pieces, I started with oversize blanks. As for the miters, the secret here is a very sharp saw blade, and a careful setting on the miter gauge.

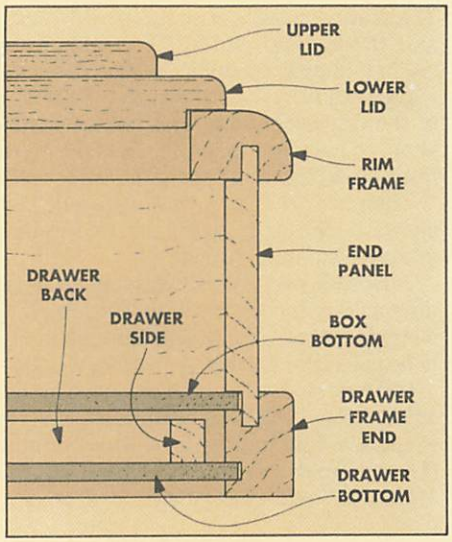
FINISH. I finished both the inside and outside of the box with two coats of General Finishes' Two-Step Sealacell (a wipe-on oil finish).

Then, to give the box and drawer bottoms a "felt-like" finish, I applied a coat of Suede-Tex flock to these parts. (For sources, see page 31.)

EXPLODED VIEW



CROSS SECTION



MATERIALS

A	Drawer Frame Fr/Bk (2)	½ x ¾ - 8
B	Drawer Frame Ends (2)	½ x ¾ - 5
C	Drawer Bottom (1)	⅛ - 4 3/16 x 7 3/16
D	Drawer Back (1)	¼ x 5/16 - 6 3/16
E	Drawer Sides (2)	¼ x 5/16 - 3¾
F	Corner Posts (4)	½ x ½ - 1½
G	Fr/Bk Panels (2)	¼ x 2 - 7
H	End Panels (2)	¼ x 2 - 4
I	Box Bottom (1)	⅛ - 4 3/16 x 7 3/16
J	Rim Frame Fr/Bk (2)	¾ x ½ - 8
K	Rim Frame Ends (2)	¾ x ½ - 5
L	Lower Lid Piece (1)	⅜ x 4 - 7
M	Upper Lid Piece (1)	¼ x 3 - 6
N	Lid Handle (1)	½ x ½ - 3

DRAWER FRAME

I started building the Secret Box from the bottom up — with the drawer frame that houses the secret compartment.

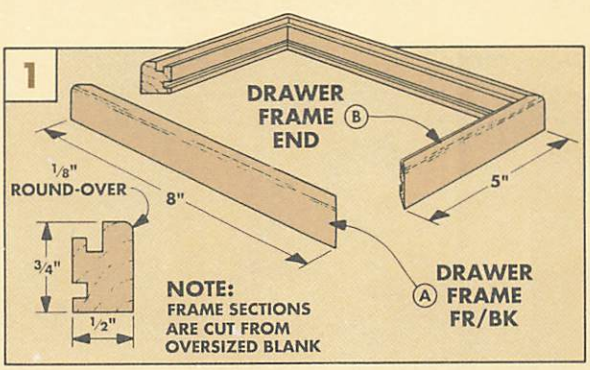
OVERSIZE BLANK. Because the drawer frame consists of four small pieces, it's safest and most efficient to start with one oversize (30"-long) blank.

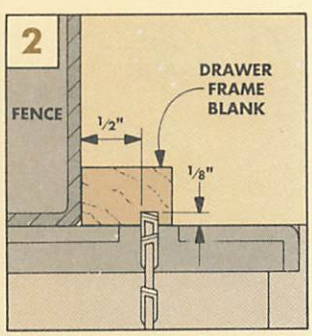
SHAPING OPERATIONS. First, cut a groove on each of two adjacent sides of the blank, see Figs. 2 and 3. Next, trim off the corner between the grooves to form a shelf for the box bottom, see Fig. 4.

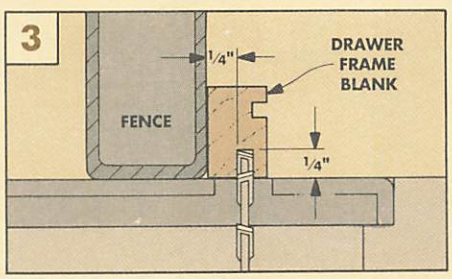
The last step before cutting the blank into sections is to round over the top outside corner, see detail in Fig. 1.

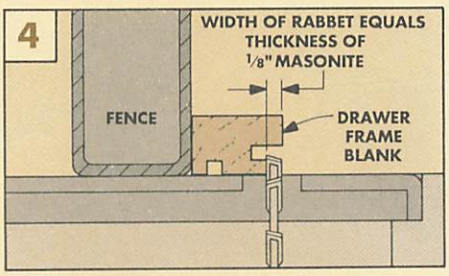
MITER TO LENGTH. Now the blank can be mitered to length to produce two **drawer frame front/back pieces (A)** and two **drawer frame ends (B)**, see Fig. 1. I used an auxiliary fence and stop block on the miter gauge to cut these accurately.

When all the frame sections are mitered, set them aside until the drawer is complete.









DRAWER

The drawer consists of a bottom of Masonite and three small sides. The sides keep "secret" things from rolling off the Masonite.

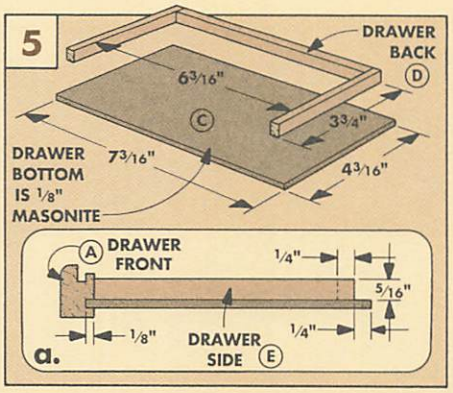
DRAWER BOTTOM. To determine the size of the drawer bottom, first measure from short-point to short-point on one of the frame front/back pieces and one of the frame ends.

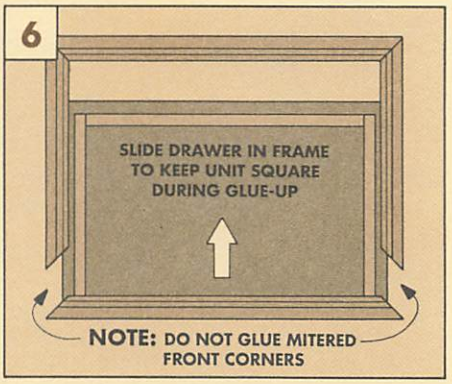
Then add 3/16" to each dimension. This allows the Masonite to fit in the two 1/8"-deep grooves with room to slide.

Now cut a piece of 1/8" Masonite to these dimensions for the **drawer bottom (C)**. Note: Also cut a second piece identical in size to be used later for the box bottom (I).

DRAWER SIDES. The drawer sides start out as one 16"-long blank of 1/4"-thick stock. This is cut to length to produce a **drawer back (D)** and two **drawer sides (E)**, see Fig. 5.

Now glue the drawer back and sides in place on the drawer bottom, see Fig. 5a.





ASSEMBLE DRAWER FRAME. Next, glue the drawer frame front (A) onto the front edge of the drawer, see Fig. 5a. Now the rest of the drawer frame pieces can be glued together into a U-shape. While the glue on all the pieces is still tacky, slide the drawer into the frame, see Fig. 6.

BOX SIDES

The sides of the "real" box are built on top of the secret drawer. This compartment consists of four panels that fit into four corner posts, see Fig. 7.

CORNER POSTS. The four corner posts start out as one long blank. I cut it from 1/2"-thick cherry, see Fig. 7.

GROOVES AND ROUND-OVER. To accept the side panels, the corner posts have grooves cut on adjacent sides, see Fig. 8.

After cutting the two grooves in the long blank, round over the outside corner on the router table, see Fig. 9. Now the blank can be crosscut to produce four identical-length **corner posts (F)**, see Fig. 7.

BOX SIDES. To contrast with the cherry posts, I made the side panels from red oak. Begin the side panels by first ripping a piece of 3/4"-thick stock to finished width (1/2" wider than the length of the corner posts). This extra width accommodates tongues on the top and bottom edge that fit in grooves in the frames, see Cross Section on page 25.

Now cut the piece to a rough length of 12". After that, resaw and plane the blank to produce two 1/4"-thick pieces.

Next, crosscut the two pieces to produce two **front/back panels (G)** and two **end panels (H)**, see Fig. 7.

RABBETS. Each panel has a rabbet on all four edges. These rabbets create tongues that fit into grooves in the corner posts and also the drawer and rim frames.

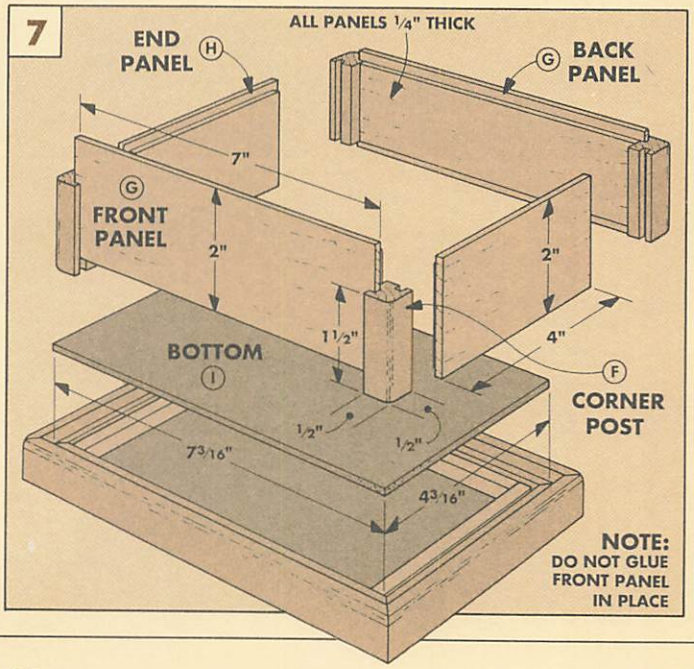
Note: I used a 1/2" straight bit in the router table to cut all the rabbets. But they're not all routed the same. The rabbets on the top and bottom edges of each panel should be 1/4" wide. The rabbets on the ends should be 1/8" wide, see Fig. 10.

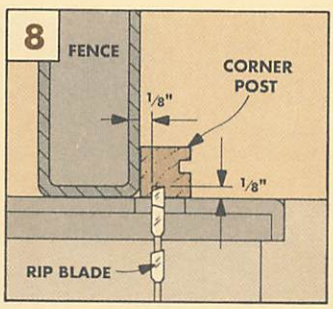
The trick in cutting the rabbets is setting the bit height — sneak up on the height so the tongue fits snugly into the grooves.

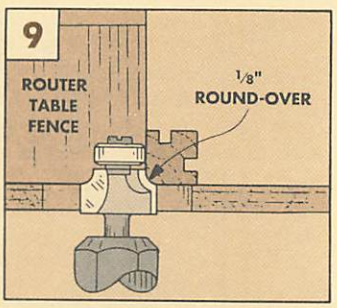
After the rabbets have been cut on all four panels, dry assemble them into the corner posts. (First place the **box bottom (I)** into the top of the drawer frame, see Fig. 7.)

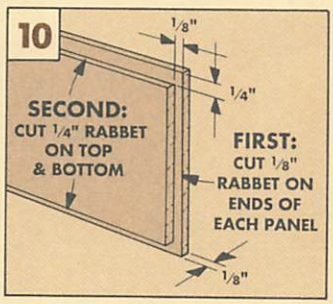
For a proper fit, the outside corners of the corner posts must align with the joint lines on the mitered drawer frame, see Fig. 11.

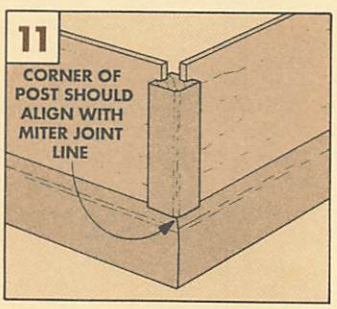
ASSEMBLE BOX. Once everything fits well, the box bottom, panels, and posts can be glued up. Note: *Don't* glue the box bottom to the drawer front. And *don't* glue in the front panel — it slides in the grooves in the posts.











RIM FRAME

At this point the box really just needs a lid to make it complete. But first there's a frame added around the top edge of the box. This dresses up the top of the box and provides a handle at the front to lift up the front panel.

RIM BLANK. Just like the drawer frame, the rim frame starts out as an oversize (30"-long) blank. But the rim frame isn't oriented the same as the drawer frame. The drawer frame stands on its *narrow* (½") edge, but the rim frame lies on its *wide* (¾") edge, refer to Cross Section on page 25.

First cut a groove in the blank to fit over the panels, see Fig. 13. Then rout a round-over on the two outside edges, see Fig. 12.

MITER TO LENGTH. Now the rim frame can be mitered to fit around the top of the box. And these are probably the most important cuts on the whole box. A good, tight fit here will hide the fact that the front of the box isn't really glued. (It can be lifted to unlock the secret drawer.)

The ends of the frame pieces must be cut to exactly intersect the corner posts, see Fig. 14a. But the grooves on the frame pieces must also align with the tongues at the top of the box sides.

The solution to this problem is the same that I use in cutting any workpiece to a critical length — sneak up on the cut.

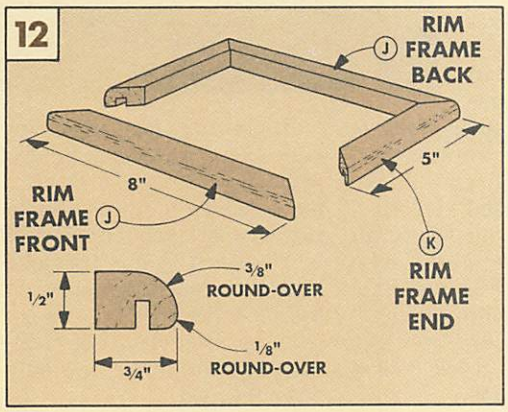
I used the miter gauge on the table saw to miter the blank to rough length for the **rim frame front** and **back (J)** and two **rim frame ends (K)**.

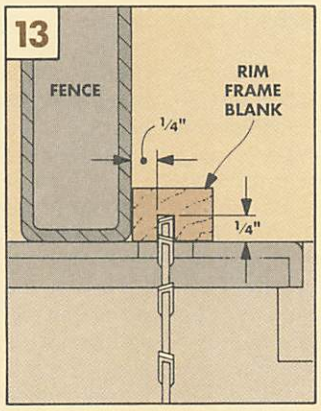
Then, to sneak up on the finished length of the frame pieces, I used the disc sander with a miter gauge, see box at right.

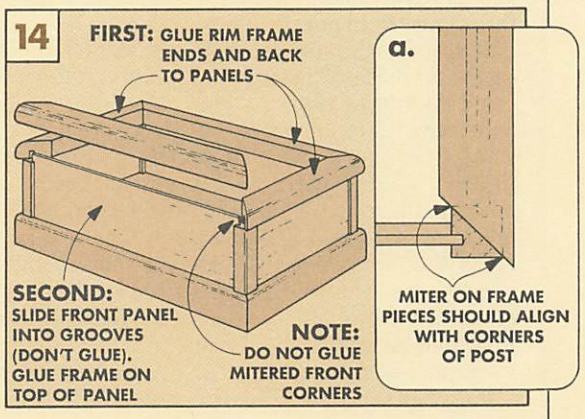
ATTACH TO BOX. After the rim frame pieces are cut to length, three of the pieces can be glued onto the tongues around the top edge of the box, see Fig. 14. The front frame piece is then glued onto the front panel, and positioned so the miters align with the corners. Note: *Do not glue* these front corners.

SANDING TO LENGTH

Here's a way to get more accurate frame pieces. First cut each piece slightly long. Use a disc sander to sneak up on the exact length.






14
FIRST: GLUE RIM FRAME ENDS AND BACK TO PANELS
SECOND: SLIDE FRONT PANEL INTO GROOVES (DON'T GLUE). GLUE FRAME ON TOP OF PANEL
NOTE: DO NOT GLUE MITERED FRONT CORNERS
a.
MITER ON FRAME PIECES SHOULD ALIGN WITH CORNERS OF POST

LID

Building the lid completes the Secret Box. The lid is made up of three parts: a lower lid piece, an upper lid piece, and a handle.

RESAW LID PIECES. The lower and upper lid pieces are not the same thickness. But to make the assembled lid look better, I cut both from one length of ¾"-thick stock, see Figs. 15 and 15a.

First I resawed, then planed the two blanks to the specified thicknesses, see Fig. 15a.

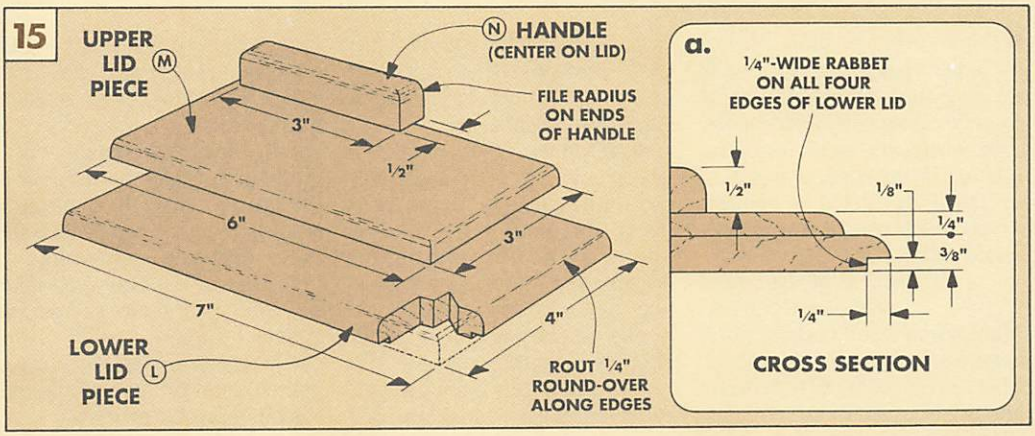
CUT TO SIZE. Then cut the **lower lid (L)** to finished size (1" *smaller* in both dimensions than the outside measurements of the rim frame, see Fig. 15).

Next, cut the **upper lid (M)** to finished size (1" smaller in both dimensions than the lower lid), see Fig. 15.

RABBETS. The lower lid fits over the rim frame and is held in place by a narrow rabbet around all four sides, see Fig. 15a.

ROUND-OVERS. After routing rabbets around the bottom edges of the lower lid, the top edges of both pieces are rounded over.

Now center the upper lid piece on the lower lid piece and glue the two together.



LID HANDLE. The **lid handle (N)** is made from a piece of ½" x ½" stock cut 3" shorter than the upper lid piece, see Fig. 15. Then round over the top outside edges, and radius the top ends, see Fig. 15.

Finally, the handle can be glued in place.

Talking Shop

REDWOOD TREES

■ *Somewhere a long time ago I got it in my head that there was a shortage of redwood. But it always seems readily available at the local lumberyard. Have I been mistaken all these years?*

George Lynch Jr.
Oak Harbor, Washington

There's never actually been a shortage of redwood trees. But the amount available for harvest has fluctuated through the years. This has resulted in shortages of redwood lumber around the country from time to time — and some dramatic price increases in the last 25 years.

A CALIFORNIA TREE. As you may know, the range where redwood trees can grow is quite limited. (Along the coast of northern California and about 40 miles into Oregon.) These are areas that are blanketed with summer fog. This fog provides enough moisture for redwoods to survive during the time of year when rains aren't frequent.

HARVEST CONTROLS. In the 1960's and 70's the state of California began imposing strict laws to protect the redwoods. These laws protected all Giant Sequoias from harvest, and regulated the harvesting and reforestation of all Coastal Redwood trees.

What was the effect of this legislation? In 1968, 1.25 billion board feet of redwood were harvested annually. By 1980 that number had dropped to 488 million board feet. Today, the production level has climbed back up to around 1 billion board feet.

COOPERATION. The tough laws that were passed in California, along with cooperation from foresters, have gone a long ways toward saving the redwoods for future generations.

"There were 1.8 million acres of land available in California for redwoods to grow on when commercial harvesting began around the turn of the century," according to Ross Johnson of the California Department of Forestry. "Today there are still approximately 1.6 million acres available."

PHOTO COURTESY OF CALIFORNIA REDWOOD ASSOC.

REFORESTATION. But even with the drop in acreage, there are more redwood trees today through reforestation than there were when the trees were first harvested. And with the land management laws that are in effect today, it's predicted that there will be more board feet of lumber available for harvest in the years to come.

The law requires that the amount of redwood harvested, can't exceed the annual growth rate. Once an area has been harvested, it must be replanted within two years with at least 300 seedlings per acre. (Unless enough trees were left behind for self-regeneration.)

THE FUTURE. Like all forestry operations, this takes a lot of planning. It takes 50 to 65 years for seedlings to grow to maturity. So what is planted today will be harvested by our grandchildren. With sound legislation and the cooperation of the redwood industry, there should be plenty of redwood lumber available down the road.

MULTI-PURPOSE VS. STAND-ALONE TOOLS

■ *I'm starting to shop around for power tools. I can't decide which way to go — buy several free-standing stationary tools, or a multi-purpose machine like a Shopsmith. I want to limit my spending to around $1500. What would you recommend I do?*

William P. McLaughlin
Denver, Colorado

Most home woodworkers don't have a lot of space for a shop. That's why multi-purpose tools like the Shopsmith are popular. They take up very little floor space, yet they perform multiple woodworking operations.

And, if you're willing to spend some time fine tuning each of the components, you can get surprisingly accurate results with one. What I like most about the Shopsmith is that it's a great example of good old-fashioned American engineering.

SMALL SHOP. A Shopsmith is a great tool for a small shop. But you might be surprised how many stationary tools a small space will accommodate. (Before you spend *any* money, you may want to read a couple books on the subject of small shops, see Sources on page 31.)

Assuming you have enough room for a basic shop (about 200 square feet) you still have to answer the questions "What kind of projects will I be working on most? And how much time will I spend woodworking?"

ROUTINE. Even building small projects often requires following a certain sequence and using many different procedures.

But on a multi-purpose tool, going from one procedure to another involves change-overs. (Like ripping a board, then drilling a mortise, then cutting a tenon.) You can't just come back to the table saw after using the drill press. First you must take down the drill press and set up again for the saw.

Change-overs can become repetitive on a project with many back and forth procedures.

SEPARATE WORKSTATIONS. For my way of working, I prefer stand-alone power tools. Each tool is a separate workstation with its own motor and a sturdy base. Besides that, the tool was designed to do just one job.

SUGGESTION. But back to your question of how to invest $1500. I suggest first buying the best 10" table saw you can afford. (The Delta model in the *Woodsmith* shop gets used a lot. On sale, it costs about $600.)

Next, I would buy a good bench-top drill press (about $200). After that, for about $350 buy a good ½"-shank router and build a table for it. With the extra $350 buy a good band saw.

Then later if you decide to expand your shop, buy an edge jointer and a thickness planer.

One more thing. If you have a small shop, build roll-around cabinets for each tool. Then when a tool isn't being used, you can roll it out of the way. Almost like a multi-purpose tool.

HARD MAPLE & ROCK MAPLE

■ *I'm planning to build bunk beds for my kids. I wanted to build them out of hard maple, but a friend told me that if I really want them to hold up, I should build them out of rock maple. All I can find is hard maple. What's rock maple and where can I get some?*

Joe Spicone
Newark, New Jersey

Hard maple and rock maple are the same thing. Both are just a name for the same wood — the wood from a sugar or black maple tree.

NAMES. So, if there's no difference between them, where did the terms "hard" and "rock" maple come from? They're common names that have been used by woodworkers and lumber retailers for years.

It's sort of like the differences in terms for a carbonated beverage. Depending on where you are in the country, this might be pop, soda, tonic, or soda pop. They're all the same thing.

DIFFERENT GRAIN PATTERNS. To complicate things even more, sugar and black maple trees can produce lumber with unusual grain patterns. These have different names still. Like curly maple, birdseye maple, and fiddleback maple. Again, these aren't different species of trees, they're just descriptive names of a unique grain pattern.

HARD VS. SOFT. The only major difference you will find in commonly available maple is the difference between the harder maples (from the sugar and black maple trees) and the softer maples (from the red and silver maple trees).

For your bunk beds, I would recommend hard maple. It's stronger and denser, providing a good durable surface.

CARBIDE CUTTERS

■ *I've used carbide-tipped saw blades for years with great results. Recently I came across some carbide-tipped knives that will fit my edge jointer and thickness planer. The idea of using them sounds great, but they are expensive. Should I make the switch to carbide for the jointer and planer?*

Steven Mark
Houston, Texas

Most large cabinet shops use carbide-tipped knives for their thickness planers and edge jointers because it's more cost effective. They stay sharper longer than high-speed steel knives, so they don't have to be changed as often. (Some claim they last ten times as long.)

But in my experience, the average home woodworker doesn't use a jointer or planer enough to justify the cost of a set of carbide-tipped knives.

SOME FIGURES. A good example of this would be the knives for a Delta 13" thickness planer. A set of steel knives for this tool will cost around $60. But carbide knives can run $175.

Another thing to keep in mind is the higher cost to have carbide knives sharpened. Locally, it costs $30 to have a set of 13" high-speed steel knives sharpened. But to have a set of 13" carbide knives sharpened runs about $90.

SHOP USAGE. From the reader surveys that we've conducted, we've found that the average *Woodsmith* reader works in the shop about 6 hours per week. Under these conditions, a set of steel knives should remain sharp for at least a year.

If you spend more time in your shop, then you'll have to determine your break-even point and decide if it's a worthwhile move.

GLUE STRENGTH

■ *You rely on yellow woodworker's glue for a lot of joinery in* Woodsmith. *What makes you so sure glue by itself (with no biscuits or dowels) will hold the boards together securely?*

Michael Burke
Sister Bay, Wisconsin

Certain types of joinery can benefit (and be strengthened) by adding mechanical reinforcement. For example, end-grain joints require a mechanical aid to provide a good glue surface.

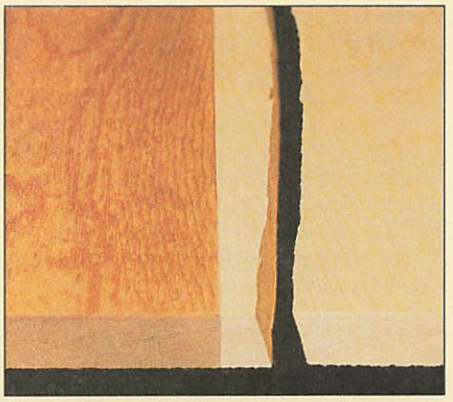
But with edge-to-edge joints, biscuits, dowels, or splines may actually weaken the joint if they are not mounted with great care. (However, I sometimes use biscuits and splines to *align*, not strengthen, the adjoining surfaces of a panel during glue-up.)

It's all a matter of understanding what the glue is actually doing.

GLUE'S HOLDING POWER. There's a misunderstanding as to how yellow glue works. A lot of people think glue gets its strength from *mechanical adhesion* — the molecules of the glue penetrate the pores of the wood and form little "hooks" that hold the wood together like a strip of Velcro.

True, some of the glue does penetrate the wood fibers. But yellow glue gets most of its strength from *specific adhesion*. This creates a bond between the glue and wood molecules — a thin layer on one piece of wood sticks to a thin layer on the mating piece. (To get an idea of what's going on, put a drop of water between two pieces of glass — then try tc get them apart.)

PREPARATION. Preparation of the edges is the key. If the edges of the wood have been properly prepared, the result will be a bond that's actually *stronger* than the wood. When a properly glued-up edge joint breaks, it usually breaks the wood, not the glue line, see photo.



Properly prepared surfaces and correctly applied glue will produce a very strong edge joint. Excessive force will tear the wood fibers before breaking the glue joint.

So what's the secret to a strong glue joint? Three things. First, the mating surfaces must be as flat and smooth as possible (almost like glass).

Second, the glue must be applied consistently and evenly. Any interruptions to the glue line will weaken the bond.

And third, when clamping the joint, there should be even clamping pressure along the joint line. Enough to cause the glue to flow into a dense film inside the joint. And enough so you see small beads — not globs — squeezing out along the face of the joint.

Finishing Tips

Here are the winners of our Finishing Contest. They're three tips that will save you time and trouble.

ONE-STEP FINISHES

■ Several manufacturers offer a "one-step" finish — a mix of stain and polyurethane. This way you can apply the stain and the top coat at the same time.

It seems like a great idea, but sometimes the stain doesn't go on evenly, it streaks. This happened to **W. J. Kopp** of Oak Ridge, Tennessee. And in an effort to rescue a bad finish, he found a solution.

What he does is apply a coat of the polyurethane/stain and let it dry just until it gets tacky. Then, he dampens a piece of open-textured cloth, such as cheesecloth or an old T-shirt, with mineral spirits and starts wiping the tacky finish, see photo.

The mineral spirits softens and re-distributes the stain. The result is a more even color and a smoother surface.

Additional coats can be applied in the same manner. Try sanding lightly between coats with 320-grit sandpaper.

LARGE SURFACES

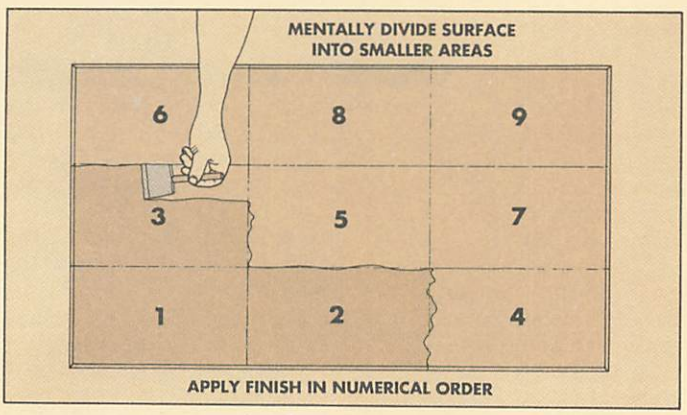
■ The main goal in applying a coat of paint or varnish is to end up with a smooth, uniform surface. One way to do that is to always work to what's called a "wet edge." The idea is that each stroke touches the wet edge of the previous stroke, so the finish can flow together without brush marks or ridges.

But it can be difficult to cover a large surface like a table top without it starting to dry somewhere. To solve this problem, **R.E.L. Whitten, Jr.** of Dallas, Texas, suggests mentally dividing the surface into small areas that can be covered with two or three brushfuls, see drawing.

Then apply the finish on area 1, then area 2, then area 3, and so on. You'll always be working the finish into an area or along an edge that hasn't set-up yet, so the finish can flow together.

Mr. Whitten also suggests using slower brush strokes. He says most people's brush stroke is too fast. They wind up adding more finish to cover the skips.

A slow stroke allows the finish to flow onto the surface more evenly, and it takes longer for the brush to run dry.



FINISH SCRAPER

■ What do you do about a hair or speck of dust or a bristle from a brush in a dry finish? How can you get that stuff off without ruining the finish? **Alan Kuetemeyer** of Traverse City, Michigan, suggests using a utility knife blade, see drawing.

But don't cut the stuff off — scrape it off. Alan explained that when using a fresh utility knife blade like a scaper, most types of imperfections can be corrected.

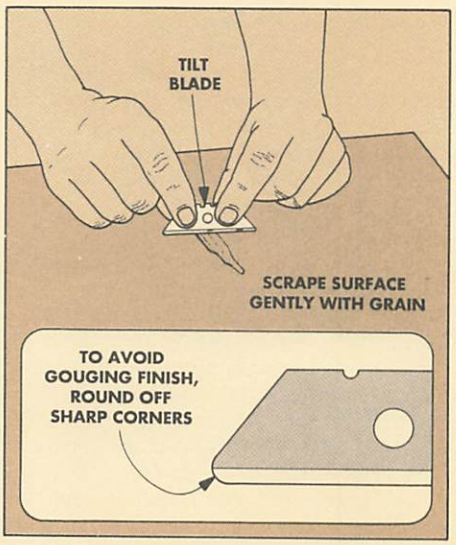
To use a blade as a scraper, first let the surface dry at least 24 hours. Otherwise you risk pulling the finish off the wood.

Then, to remove hairs and bristles, hold the blade in your fingers like a cabinet scraper. Now scrape lightly with the grain until the flaw is removed and the surface of the finish is smooth.

Since the scraper blade doesn't have a "hook" on the edge like a cabinet scraper, it removes very little material on each pass.

Alan says this procedure also works for removing runs in the finish. Gradually wear down the surface — don't try to cut the runs off.

If you're going to try this, first grind the sharp points off the ends of the blade so you don't accidentally gouge the finish, see detail in drawing.



Sources

CHESS BOARD

Woodsmith Project Supplies is offering a hardware kit for the Chess Board shown on page 6. (Note: Wood is not included.)

W783-100 Chess Board Hardware Kit $19.95

- (1) Spring Catch, Solid Brass, with Brass Mounting Pins and Mounting Instructions
- (1 pair) Jewelry Box Stop Hinges, Solid Brass, Holds Lid Open at a 110° Vertical Position, with Mounting Screws

CHESS PIECES

After you've built the Chess Board, you may want to purchase a nice set of chess pieces to go along with it. If you make the dividers as we have shown on page 11, the larger compartments will hold pieces up to 4⅜" tall. (The king is the tallest chess piece.) And the smaller compartments will hold the shortest pieces (pawns) up to 3" tall.

The chess pieces we used for the photos are the classic Staunton design. The king is 3½" tall.

The U.S. Chess Federation has an extensive mail order catalog of pieces, boards, books, and other chess-related items. For more information, call them at 800–388–5464.

CHECKERS. Checkers are also available from the Mail Order Sources listed below, at right.

CHILD'S COAT RACK

Woodsmith Project Supplies is offering a kit of parts to build the Child's Coat Rack shown on page 12. This is not a ready-to-assemble kit. Some of the hardwood parts (smokestack, dowels, and wheels) are included, but you must provide the wood for the main pieces.

W783-200 Child's Coat Rack Kit $6.95

- (1) Smokestack with ⅝" Shaft
- (5) ½" x 3" Dowels
- (5) ⅝" x 2"-Dia. Wheels
- (5) ¼" Axle Pins
- (2) Keyhole Hangers, 9/16" x 1⅝" with No. 8 x ¾" Fh Screws

INSTANT GLUE. In building the Clothes Rack, we used instant glue to attach the pieces of the train to the base. The glue we chose sets up in 20 to 50 seconds. This allows some work time, but a relatively fast "hold."

Woodsmith Project Supplies is offering this instant glue. We recommend you also order the solvent to remove glue from your hands and clothing.

W4010-210 Special "T" Glue, 2 oz. Bottle $9.95

W4010-220 Ultra Solvent, 2 oz. Bottle $4.95

SLEIGH CENTERPIECE

The polished brass hardware to build the Sleigh Centerpiece can be found in most hobby shops.

Woodsmith Project Supplies is also offering these brass parts. You will have to cut and shape them to finished size. (Note: Wood is not included.)

W783-300 Sleigh Centerpiece Hardware Kit $6.95

- (3) Brass Strips, .064" Thick, ¼" Wide, 12" Long
- (3) ⅛" Brass Rod, 12" Long
- (20) Brass Rh Screws, No. 2 x ¼"

SUEDE-TEX

We used Suede-Tex, a special flocking material, to line the inside bottom of the Chess Board (page 6) and the Secret Box (page 24). You could also line these with felt or another fabric.

Suede-Tex consists of a colored undercoat adhesive that's painted on the surface. Then millions of tiny rayon fibers are dropped (or shot through a hand-operated spray gun) onto the wet adhesive. Once the adhesive dries, the fibers are left standing on end.

Suede-Tex is manufactured by DonJer Products. Their phone, as well as another mail order source, is listed below.

ROUTER BITS

We used a variety of router bits to build the projects in this issue. **Woodsmith Project Supplies** is offering these high-quality, carbide-tipped bits. Order the shank size to fit your router.

W1514-811 ⅛" Round-Over Bit (¼" shank) $23.95
W1512-821 ⅛" Round-Over Bit (½" shank) $26.95
W1514-814 ¼" Round-Over Bit (¼" shank) $23.95
W1512-823 ¼" Round-Over Bit (½" shank) $24.95
W1514-817 ⅜" Round-Over Bit (¼" shank) $26.95
W1512-826 ⅜" Round-Over Bit (½" shank) $25.95
W1514-603 ⅛" Straight Bit (¼" shank) $10.95
W1514-643 ½" Straight Bit (¼" shank) $13.95
W1512-676 ½" Straight Bit (½" shank) $14.95
W1514-381 V-Groove Bit (¼" shank) $23.95
W1514-170 Chamfer Bit (¼" shank) $21.95
W1512-175 Chamfer Bit (½" shank) $23.95

SMALL SHOPS

On page 28 we talked about choosing tools for a small shop. There are a couple good books from Taunton Press with more information about small shops. One is *Fine Woodworking on The Small Workshop*. It's available from Taunton, see below.

A second is *The Workshop Book*. It's also available from the sources listed below, or from **Woodsmith Project Supplies**.

W2004-155 *The Workshop Book* $34.95

ORDER INFORMATION

BY MAIL

To order by mail, use the form enclosed with the current issue. The order form includes information on handling and shipping charges, and sales tax. Send your mail order to:

Woodsmith Project Supplies
P.O. Box 10350
Des Moines, IA 50306

BY PHONE

For fastest service use our Toll Free order line. Open Monday through Friday, 7:00 AM to 7:00 PM Central Time.

Before calling, have your VISA, MasterCard, or Discover Card ready.

1-800-444-7527

Note: Prices subject to change after December, 1992.

MAIL ORDER SOURCES

Similar hardware and supplies may be found in the following catalogs. Please call each company for a catalog or information.

Constantine's
800–223–8087
Spring Catch, Checkers, Clothes Rack Wood Parts, Keyhole Hangers, Instant Glue, Suede-Tex, Router Bits, *The Workshop Book*

The Woodworkers' Store
612–428–2199
Chess Board Hardware, Checkers, Clothes Rack Wood Parts, Keyhole Hangers, Instant Glue, Router Bits, *The Workshop Book*

DonJer Products
800–336–6537
Suede-Tex

Woodworker's Supply
800–645–9292
Stop Hinges, Checkers, Clothes Rack Wood Parts, Instant Glue, Suede-Tex, Router Bits

Woodcraft
800–225–1153
Chess Board Hinges, Instant Glue, Router Bits, *The Workshop Book*

Taunton Press
800–888–8286
Books: *Fine Woodworking on The Small Workshop, The Workshop Book*

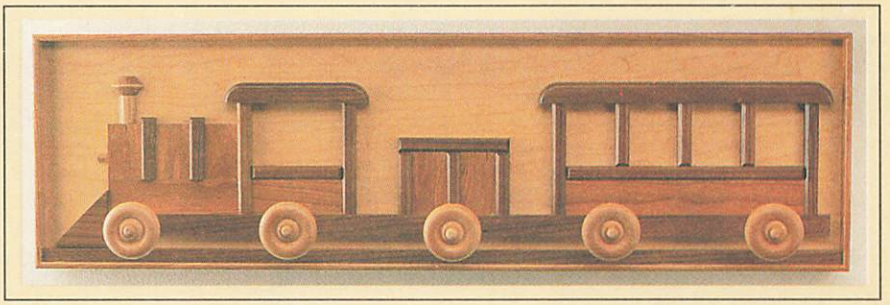
Geneva Specialties
800–556–2548
Spring Catch, Checkers, Clothes Rack Wood Parts, Router Bits

Meisel Hardware
800–441–9870
Checkers, Clothes Rack Wood Parts

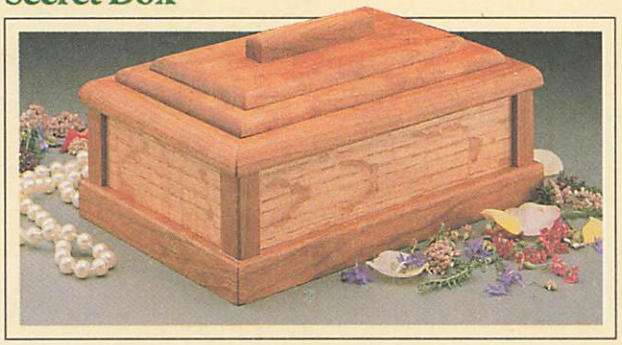
Final Details

Child's Clothes Rack

► *The small parts of the train on this Clothes Rack are cut from strips of cherry and walnut. Then they're glued onto a framed piece of plywood like a 3-D jigsaw puzzle.*



Secret Box

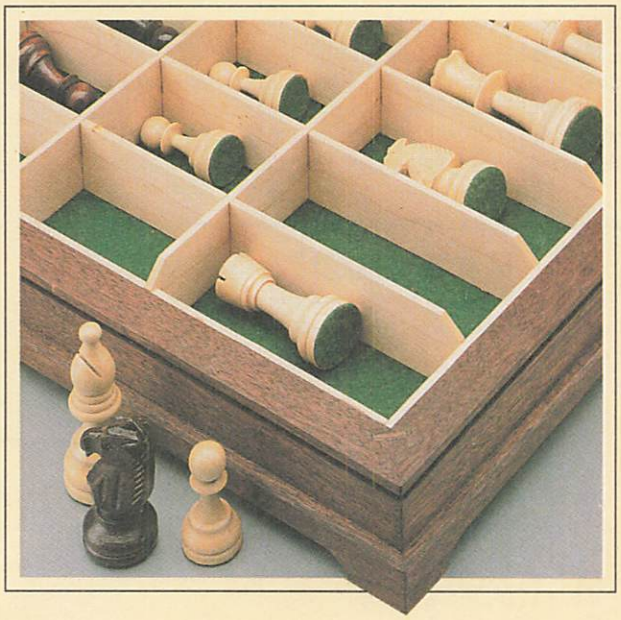


◄ *A small box doesn't have to be ordinary. The side panels of this Secret Box are quartersawn red oak, and the rest of the box is made from cherry. The secret is a hidden drawer.*

Sleigh Centerpiece

▲ *The Sleigh Centerpiece looks like the real thing. The runners are thin strips of solid walnut bent around a piece of pipe. We added brass strips for a bright, authentic look.*

Chess Board



◄ *Maple dividers can be made to fit inside the Chess Board case like an egg crate. Short walnut splines strengthen the mitered corners of the case.*